Geology Subject Index
Volume 12

absolute age *see also* geochronology; isotopes

absolute age—dates

anorthosite: Origin and age of Adirondack anorthosites re-evaluated with Nd isotopes; discussion and reply
(Parrish, Randall R., *et al.*) 6: 380

gneisses: Rb-Sr isotope systematics and contrasting histories of late Archean gneisses, West Greenland
(Grant, N. K., *et al.*) 10: 599

granodiorite: Geochronologic and isotopic evidence for early Proterozoic crust in the eastern Arabian Shield
(Stacey, John S., *et al.*) 5: 310

intrusive rocks: Geochronology of the Monteregian Hills alkaline igneous province, Quebec
(Eby, G. Nelson) 8: 468

marine sediments: Holocene rise of relative sea level at Sable Island, Nova Scotia, Canada
(Scott, D. B., *et al.*) 3: 173

metamorphic rocks: Pogallo Line, South Alps, northern Italy; an intermediate crustal level, low-angle normal fault?
(Hodges, K. V., *et al.*) 3: 151

organic materials: Recurrent Holocene strike-slip faulting, Pyramid Lake fault zone, western Nevada
(Anderson, Larry W., *et al.*) 11: 681

pitchblende: Sm-Nd direct dating of the Collins Bay hydrothermal uranium deposit, Saskatchewan
(Fryer, B. J., *et al.*) 8: 479

sanidine: Rare-element-enriched, S-type ash-flow tuffs containing phenocrysts of muscovite, andalusite, and sillimanite, southeastern Peru
(Noble, Donald C., *et al.*) 1: 35

volcanic rocks: Catastrophic debris avalanche from ancestral Mount Shasta Volcano, California
(Crandell, D. R., *et al.*) 3: 143

— K-Ar dating of the Cima volcanic field, eastern Mojave Desert, California; late Cenozoic volcanic history and landscape evolution
(Dohrenwend, John C., *et al.*) 3: 163

zircon: Precambrian gneiss and late Proterozoic sedimentation in north-central British Columbia
(Evenchick, Carol A., *et al.*) 4: 233

— Short-lived 1.9 Ga continental margin and its destruction, Wopmay Orogen, Northwest Canada
(Hoffman, Paul F., *et al.*) 2: 68

— Timing of pre-Antler deformation in the Shoo Fly Complex, Sierra Nevada, California
(Girty, Gary H., *et al.*) 11: 673

— Was the Alexander Terrane a source of feldspathic sandstones in the Shoo Fly Complex, Sierra Nevada, California?
(Girty, Gary H., *et al.*) 6: 339

absolute age—methods

Sr/Rb: Rubidium-strontium dating of ore deposits hosted by Rb-rich rocks, using calcite and other common Sr-bearing minerals
(Ruiz, Joaquin, *et al.*) 5: 259

acoustical surveys *see under* geophysical surveys *under* Pacific Ocean

aeromagnetic surveys *see* magnetic surveys *under* geophysical surveys *under* Alabama

Africa *see also* Egypt; Morocco; South Africa

Alabama—geophysical surveys

magnetic surveys: Truncation of the Appalachian Piedmont beneath the coastal plain of Alabama; evidence from new magnetic data
(Horton, J. Wright, Jr., *et al.*) 1: 51

Alaska—petrology

magmas: Magmatic epidote and its petrologic significance
(Zen, E-an, *et al.*) 9: 515

Alaska—seismology

earthquakes: Wrangell Benioff zone, southern Alaska
(Stephens, C. D., *et al.*) 6: 373

Alaska—tectonophysics

plate tectonics: Model for the origin of the Yakutat Block, an accreting terrane in the northern Gulf of Alaska; discussions and replies
(Plafker, George, *et al.*) 9: 563

— Wrangell Benioff zone, southern Alaska
(Stephens, C. D., *et al.*) 6: 373

algal flora—diatom flora

Pliocene: Cenozoic marine sedimentation and ice-volume variation on the East Antarctic Craton
(Webb, P. N., *et al.*) 5: 287

algal flora—nannofossils

Eocene: Eocene-Oligocene boundary; biostratigraphic recognition and gradual paleoceanographic change at DSDP Site 549
(Snyder, Scott W., *et al.*) 2: 112

algal flora—paleoecology

reefs: Were there framework reefs in the Cambrian?
(Rowland, Stephen M.) 3: 181

Alps *see also* the individual countries

Alps—geochronology

Triassic: Fission-track evidence for Late Triassic oceanic crust in the French Occidental Alps
(Carpena, Joelle, *et al.*) 2: 108

Alps—sedimentary petrology

sedimentary structures: Neptunic dikes and their relation to hydrodynamic circulation of submarine hydrothermal systems; discussion and reply
(Fuchtbauer, Hans, *et al.*) 4: 251

Alps—tectonophysics

crust: Pogallo Line, South Alps, northern Italy; an intermediate crustal level, low-angle normal fault?
(Hodges, K. V., *et al.*) 3: 151

ammonites *see* Mollusca

ancient ice ages *see under* glacial geology

Andes *see also* the individual countries

Antarctic Ocean—oceanography

sediments: Dispersed rhyolitic tephra from New Zealand in deep-sea sediments of the Southern Ocean
(Kyle, Philip R., *et al.*) 8: 487

Antarctica—stratigraphy

Cambrian: Newly discovered youngest Cambrian or oldest Ordovician fossils from the Robertson Bay Terrane (formerly Precambrian), northern Victoria Land, Antarctica
(Wright, Thomas O., *et al.*) 5: 301

Cenozoic: Cenozoic marine sedimentation and ice-volume variation on the East Antarctic Craton
(Webb, P. N., *et al.*) 5: 287

Neogene: Late Tertiary history of the Antarctic ice sheet; evidence form the dry valleys
(Denton, George H., *et al.*) 5: 263

Ordovician: Newly discovered youngest Cambrian or oldest Ordovician fossils from the Robertson Bay Terrane (formerly Precambrian), northern Victoria Land, Antarctica
(Wright, Thomas O., *et al.*) 5: 301

Pliocene: Cenozoic marine sedimentation and ice-volume variation on the East Antarctic Craton
(Webb, P. N., *et al.*) 5: 287

Apennines—structural geology

tectonics: Sedimentary basins formed and carried piggyback on active thrust sheets
(Ori, G. G., *et al.*) 8: 475

Appalachians *see also* the individual states and provinces

Appalachians—seismology
crust: Reprocessed COCORP Southern Appalachian reflection data; root zone to coastal plain; discussion and reply
(Cook, Frederick A., *et al.*) 4: 249

Appalachians—stratigraphy
Pennsylvanian: Correlation of Carboniferous strata using a hierarchy of transgressive-regressive units
(Busch, Richard M., *et al.*) 8: 471

Appalachians—structural geology
tectonics: Truncation of the Appalachian Piedmont beneath the coastal plain of Alabama; evidence from new magnetic data
(Horton, J. Wright, Jr., *et al.*) 1: 51

Appalachians—tectonophysics
crust: Seismicity and suspect terranes in the southeastern United States
(Wheeler, Russell L., *et al.*) 6: 323
plate tectonics: Paleozoic evolution of the Armorica Plate on the basis of paleomagnetic data
(Perroud, Herve, *et al.*) 10: 579

Arabian Peninsula *see also* Saudi Arabia

Arabian Peninsula—tectonophysics
crust: Geochronologic and isotopic evidence for early Proterozoic crust in the eastern Arabian Shield
(Stacey, John S., *et al.*) 5: 310

Archaeocyatha—paleoecology
reefs: Were there framework reefs in the Cambrian?
(Rowland, Stephen M.) 3: 181

archaeology *see also under* stratigraphy *under* Holocene; Maine

Archean *see also under* geochronology *under* Greenland

Archean—tectonophysics
crust: Primordial degassing, lithosphere thicknesss, and the origin of komatiites
(Warren, Paul H.) 6: 335

archeology *see* archaeology *under* stratigraphy *under* Holocene; Maine

Arctic Ocean—stratigraphy
Cenozoic: Baffin Bay; present-day analog of the central Arctic during late Pliocene to mid-Pleistocene time; discussion and reply
(Kellogg, Thomas B., *et al.*) 6: 378
Eocene: Paleogene paleoceanography of the Arctic Ocean is constrained by the middle or late Eocene age of USGS core Fl-422; evidence from silicoflagellates
(Bukry, David) 4: 199
Paleogene: Paleogene paleoceanography of the Arctic Ocean is constrained by the middle or late Eocene age of USGS core Fl-422; evidence from silicoflagellates
(Bukry, David) 4: 199
Quaternary: Baffin Bay; present-day analog of the central Arctic during late Pliocene to mid-Pleistocene time; discussion and reply
(Kellogg, Thomas B., *et al.*) 6: 378

Arctic region *see also* the individual countries; Greenland

Arizona—geomorphology
meteor craters: Origin of impact craters; ideas and experiments of Hooke, Gilbert, and Wegener
(Drake, Ellen T., *et al.*) 7: 408

Arizona—stratigraphy
Miocene: Paleomagnetism of Miocene volcanic rocks from southwestern Arizona; tectonic implications
(Calderone, Gary, *et al.*) 10: 627

Arizona—structural geology
deformation: Compressive strains generated by normal faulting
(Brumbaugh, David S.) 8: 491
neotectonics: Direction of absolute movement along the boundary faults of the Basin and Range-Colorado Plateau margin
(Hamblin, W. K.) 2: 116
— Paleomagnetism of Miocene volcanic rocks from southwestern Arizona; tectonic implications
(Calderone, Gary, *et al.*) 10: 627
tectonics: Reinterpretation of Lime Peak thrust as a low-angle normal fault; implications for the tectonics of southeastern Arizona
(Dickinson, William R.) 10: 610
— Role of tectonic denudation in warping and uplift of low-angle normal faults
(Spencer, Jon E.) 2: 95

artifacts *see* archaeology *under* stratigraphy *under* Holocene; Maine

Asia *see also* Arabian Peninsula; Indonesia; Japan

Atlantic Coastal Plain—stratigraphy
Paleogene: Suwannee channel of the Paleogene coastal plain; support for the "carbonate suppression" model of basin formation
(McKinney, Michael L.) 6: 343

Atlantic Coastal Plain—structural geology
neotectonics: Origin of the epeirogenic uplift of Pliocene-Pleistocene beach ridges in Florida and development of the Florida karst
(Opdyke, Neil D., *et al.*) 4: 226

Atlantic Ocean *see also* Gulf of Mexico; Irish Sea

Atlantic Ocean—geophysical surveys
seismic surveys: Early Cretaceous platform re-entrant and escarpment erosion in the Bahamas
(Schlager, Wolfgang, *et al.*) 3: 147
— Multichannel seismic evidence for anomalously thin crust at Blake Spur fracture zone
(Mutter, J. C., *et al.*) 9: 534

Atlantic Ocean—oceanography
continental slope: Spring sapping on the lower continental slope, offshore New Jersey
(Robb, James M.) 5: 278
ocean circulation: Contourite drift molded by deep Mediterranean outflow
(Faugeres, Jean-Claude, *et al.*) 5: 296
ocean floors: Rough-smooth basement boundary in the western North Atlantic Basin; evidence for a seafloor-spreading origin
(Sundvik, Michael, *et al.*) 1: 31

Atlantic Ocean—seismology
crust: Multichannel seismic evidence for anomalously thin crust at Blake Spur fracture zone
(Mutter, J. C., *et al.*) 9: 534
Mohorovicic discontinuity: Multichannel seismic evidence for anomalously thin crust at Blake Spur fracture zone
(Mutter, J. C., *et al.*) 9: 534

Atlantic Ocean—stratigraphy
Eocene: Eocene-Oligocene boundary; biostratigraphic recognition and gradual paleoceanographic change at DSDP Site 549
(Snyder, Scott W., *et al.*) 2: 112
Oligocene: Eocene-Oligocene boundary; biostratigraphic recognition and gradual paleoceanographic change at DSDP Site 549
(Snyder, Scott W., *et al.*) 2: 112

Atlantic Ocean—tectonophysics
plate tectonics: The West African connection; evolution of the central Atlantic Ocean and its continental margins
(Rodgers, John, *et al.*) 10: 635
sea-floor spreading: Rough-smooth basement boundary in the western North Atlantic Basin; evidence for a seafloor-spreading origin
(Sundvik, Michael, *et al.*) 1: 31

Atlantic Ocean Islands *see also* Iceland

Atlantic region *see also* the individual countries

Atlantic region—stratigraphy
Paleozoic: Paleozoic evolution of the Armorica Plate on the basis of paleomagnetic data
(Perroud, Herve, *et al.*) 10: 579

Atlantic region—tectonophysics
continental drift: Paleozoic evolution of the Armorica Plate on the basis of paleomagnetic data
(Perroud, Herve, *et al.*) 10: 579
— The West African connection; evolution of the central Atlantic Ocean and its continental margins
(Rodgers, John, *et al.*) 10: 635
plate tectonics: British paleomagnetism, Iapetus Ocean, and the Great Glen Fault
(Briden, J. C., *et al.*) 7: 428

atolls *see* reefs *under* paleoecology *under* algal flora; Archaeocyatha; *see* reefs *under* sedimentary petrology *under* Nevada; New Mexico; Texas
Australasia *see also* New Zealand; Papua New Guinea
Australia *see also* Northern Territory; Western Australia
Australia—economic geology
lead-zinc deposits: Ore genesis by episodic dewatering of sedimentary basins; application to giant Proterozoic lead-zinc deposits
(Sawkins, Frederick J.) 8: 451
Australia—structural geology
tectonics: Terminal fold-belt deformation; relationship of Mid-Carboniferous megakinks in the Tasman fold belt to coeval thrusts in cratonic Australia
(Powell, Christopher M.) 9: 546
avalanches *see under* mass movements *under* geomorphology
Azores *see also* Portugal
Bahamas—oceanography
ocean floors: Early Cretaceous platform re-entrant and escarpment erosion in the Bahamas
(Schlager, Wolfgang, *et al.*) 3: 147
Bahamas—sedimentary petrology
diagenesis: Transformation of aragonite-dominated lime muds to microcrystalline limestones
(Lasemi, Zakaria, *et al.*) 7: 420
Baltic region *see also* the individual countries
basalts *see under* igneous rocks
Basin and Range Province—structural geology
neotectonics: Cordilleran metamorphic core complexes; Cenozoic extensional relics of Mesozoic compression
(Coney, Peter J., *et al.*) 9: 550
— Direction of absolute movement along the boundary faults of the Basin and Range-Colorado Plateau margin
(Hamblin, W. K.) 2: 116
— Paleomagnetism of Miocene volcanic rocks from southwestern Arizona; tectonic implications
(Calderone, Gary, *et al.*) 10: 627
— Relationship of late Quaternary fault scarps to subjacent faults, eastern Great Basin, Utah
(Crone, Anthony J., *et al.*) 5: 292
biogeography—Neogene
global: Neogene marine climate trends; implications for biogeography and evolution of the shallow-sea biota
(Valentine, James W.) 11: 647
biogeography—problematic fossils
Proterozoic: Ediacarian fossils from the Carolina slate belt, Stanly County, North Carolina
(Gibson, Gail G., *et al.*) 7: 387
biography—general
Hooke, Robert: Origin of impact craters; ideas and experiments of Hooke, Gilbert, and Wegener
(Drake, Ellen T., *et al.*) 7: 408
brachiopods—biostratigraphy
Cambrian: Geological implications of Middle Cambrian boulders from the Haymond Formation (Pennsylvanian) in the Marathon Basin, West Texas
(Palmer, Allison R., *et al.*) 2: 91
Ordovician: The Decade of North American Geology 1983 geologic time scale; discussion and reply
(Ross, Reuben J., Jr., *et al.*) 8: 505
British Columbia—geochronology
Proterozoic: Precambrian gneiss and late Proterozoic sedimentation in north-central British Columbia
(Evenchick, Carol A., *et al.*) 4: 233
British Columbia—petrology
magmas: Magmatic epidote and its petrologic significance
(Zen, E-an, *et al.*) 9: 515
British Columbia—stratigraphy
Proterozoic: Subsidence analysis of the Cordilleran miogeocline; implications for timing of late Proterozoic rifting and amount of extension; discussion and reply
(Link, Paul Karl, *et al.*) 11: 699
burrows *see* ichnofossils
calcium—geochemistry
artifacts: Calcium diffusion; a new dating method for archeological materials
(Waddell, Carol, *et al.*) 1: 24
shells: Sr, Mg, and Ca chemistry of the skeleton of Nautilus
(Crick, Rex E., *et al.*) 2: 99
California—geochemistry
trace elements: Changing mercury anomalies in Long Valley, California; indication for magma movement or seismic activity
(Varekamp, Johan C., *et al.*) 5: 283
California—geochronology
Cenozoic: K-Ar dating of the Cima volcanic field, eastern Mojave Desert, California; late Cenozoic volcanic history and landscape evolution
(Dohrenwend, John C., *et al.*) 3: 163
Devonian: Timing of pre-Antler deformation in the Shoo Fly Complex, Sierra Nevada, California
(Girty, Gary H., *et al.*) 11: 673
Paleozoic: Was the Alexander Terrane a source of feldspathic sandstones in the Shoo Fly Complex, Sierra Nevada, California?
(Girty, Gary H., *et al.*) 6: 339
California—geomorphology
mass movements: Catastrophic debris avalanche from ancestral Mount Shasta Volcano, California
(Crandell, D. R., *et al.*) 3: 143
— Catastrophic debris avalanche from ancestral Mount Shasta Volcano, California; discussion and reply
(Bown, T. M., *et al.*) 12: 743
California—geophysical surveys
remote sensing: Detection of subsurface features in Seasat radar images of Means Valley, Mojave Desert, California
(Blom, Ronald G., *et al.*) 6: 346
seismic surveys: COCORP seismic profiles near Coalinga, California; subsurface structure of the western Great Valley
(Fielding, Eric, *et al.*) 5: 268
California—petrology
lava: Ultrathin lava layers exposed near San Luis Obispo Bay, California
(Moore, James G., *et al.*) 9: 542
California—sedimentary petrology
sedimentary structures: Development of foliation and fold interference patterns produced by sedimentary processes
(Tobisch, Othmar T.) 7: 441
California—seismology
crust: COCORP seismic profiles near Coalinga, California; subsurface structure of the western Great Valley
(Fielding, Eric, *et al.*) 5: 268
earthquakes: COCORP seismic profiles near Coalinga, California; subsurface structure of the western Great Valley
(Fielding, Eric, *et al.*) 5: 268
— Earthquakes and folding, Coalinga, California
(Hill, Mason L.) 12: 711
California—stratigraphy
Cambrian: Were there framework reefs in the Cambrian?
(Rowland, Stephen M.) 3: 181
California—structural geology
neotectonics: COCORP seismic profiles near Coalinga, California; subsurface structure of the western Great Valley
(Fielding, Eric, *et al.*) 5: 268
— Earthquakes and folding, Coalinga, California
(Hill, Mason L.) 12: 711
— Rates of late Cenozoic tectonism in the Vallecito-Fish Creek Basin, western Imperial Valley, California; discussion and reply
(Lowman, Paul D., Jr., *et al.*) 5: 319
tectonics: Overthrust model for the Sierra Nevada
(Moores, E. M., *et al.*) 7: 416
California—tectonophysics
plate tectonics: Californian blueschists, subduction, and the significance of tectonostratigraphic terranes
(Ernst, W. G.) 7: 436

Cambrian *see also under* stratigraphy *under* Antarctica; California; Texas

Cambrian—stratigraphy
paleoecology: Abundant and diverse early Paleozoic infauna indicated by the stratigraphic record
(Miller, Molly Fritz, *et al.*) 1: 40

Canada *see also* Appalachians; Atlantic Coastal Plain; British Columbia; Canadian Shield; New Brunswick; Newfoundland; Northwest Territories; Nova Scotia; Ontario; Quebec; Saskatchewan; Yukon Territory

Canada—economic geology
lead-zinc deposits: Ore genesis by episodic dewatering of sedimentary basins; application to giant Proterozoic lead-zinc deposits
(Sawkins, Frederick J.) 8: 451

Canada—stratigraphy
Paleozoic: Evidence against large-scale strike-slip separation of Paleozoic strata along the Richardson-Hess fault system, northern Canadian Cordillera
(Cecile, M. P.) 7: 403

Canada—structural geology
tectonics: Evidence against large-scale strike-slip separation of Paleozoic strata along the Richardson-Hess fault system, northern Canadian Cordillera
(Cecile, M. P.) 7: 403

Canadian Shield—economic geology
uranium ores: Sm-Nd direct dating of the Collins Bay hydrothermal uranium deposit, Saskatchewan
(Fryer, B. J., *et al.*) 8: 479

Canadian Shield—tectonophysics
crust: Continental intra-arc depressions; a nonextensional model for their origin, with a Proterozoic example from Wopmay Orogen
(Hildebrand, Robert S., *et al.*) 2: 73
isostasy: Concentrically zoned pattern in the Bouguer gravity anomaly map of northeastern North America; discussion and reply
(Thomas, M. D., *et al.*) 1: 57
plate tectonics: Short-lived 1.9 Ga continental margin and its destruction, Wopmay Orogen, Northwest Canada
(Hoffman, Paul F., *et al.*) 2: 68

carbon—geochemistry
marine sediments: Low productivity and slow deep-water circulation in Mid-Cretaceous oceans
(Bralower, Timothy J., *et al.*) 10: 614
sedimentary rocks: C/S method for distinguishing freshwater from marine sedimentary rocks
(Berner, Robert A., *et al.*) 6: 365

carbon—isotopes
C-13/C-12: Middle Oligocene cooling from Equatorial Pacific DSDP Site 77B
(Keigwin, Lloyd, *et al.*) 1: 16
— Problem of secondary porosity; Frio Formation (Oligocene), Texas Gulf Coast
(Lundegard, Paul D., *et al.*) 7: 399
— Salina-margin tepees, pisoliths, and aragonite cements, Lake MacLeod, Western Australia; their significance in interpreting ancient analogs
(Handford, C. Robertson, *et al.*) 9: 523

carbonate rocks *see under* sedimentary rocks

Carboniferous—stratigraphy
correlation: Correlation of Carboniferous strata using a hierarchy of transgressive-regressive units
(Busch, Richard M., *et al.*) 8: 471

Caribbean region *see also* the individual countries

Caribbean region—tectonophysics
plate tectonics: Cenozoic rift formation in the northern Caribbean
(Mann, Paul, *et al.*) 12: 732
— Comparison of volcanic production rates and subduction rates in the Lesser Antilles and Central America
(Wadge, G.) 9: 555

Carpathians *see also* the individual countries

Cenozoic *see also* Eocene; Holocene; Neogene; Paleocene; Paleogene; Tertiary; *see also under* geochronology *under* California; *see also under* stratigraphy *under* Antarctica; Arctic Ocean

Cenozoic—geochronology
time scales: Toward an objective Phanerozoic time scale
(Carr, Paul F., *et al.*) 5: 274

Cenozoic—stratigraphy
paleoclimatology: Neogene marine climate trends; implications for biogeography and evolution of the shallow-sea biota
(Valentine, James W.) 11: 647
— Temperature and biotic crises in the marine realm
(Stanley, Steven M.) 4: 205

Central America—petrology
volcanism: Comparison of volcanic production rates and subduction rates in the Lesser Antilles and Central America
(Wadge, G.) 9: 555

Central America—tectonophysics
plate tectonics: Cenozoic rift formation in the northern Caribbean
(Mann, Paul, *et al.*) 12: 732

changes of level *see also* epeirogeny; *see also under* geomorphology *under* Maine; *see also under* stratigraphy *under* Nova Scotia

clastic rocks *see under* sedimentary rocks

clastic sediments *see under* sediments

clay *see under* clastic sediments *under* sediments

clay mineralogy—areal studies
Montana: Model for K-bentonite formation; evidence from zoned K-bentonites in the Disturbed Belt, Montana
(Altaner, Stephen P., *et al.*) 7: 412

clay mineralogy—experimental studies
diffusion: Calcium diffusion; a new dating method for archeological materials
(Waddell, Carol, *et al.*) 1: 24

cleavage *see under* style *under* foliation

climate, ancient *see* paleoclimatology

Colorado Plateau *see also* the individual states

Colorado Plateau—structural geology
neotectonics: Direction of absolute movement along the boundary faults of the Basin and Range-Colorado Plateau margin
(Hamblin, W. K.) 2: 116

Columbia Plateau *see also* the individual states

Columbia Plateau—petrology
lava: Physical and chemical constraints on the evolution of the Columbia River Basalt
(Hooper, P. R.) 8: 495

congresses *see* symposia

conodonts—biostratigraphy
Cambrian: Newly discovered youngest Cambrian or oldest Ordovician fossils from the Robertson Bay Terrane (formerly Precambrian), northern Victoria Land, Antarctica
(Wright, Thomas O., *et al.*) 5: 301
Ordovician: The Decade of North American Geology 1983 geologic time scale; discussion and reply
(Ross, Reuben J., Jr., *et al.*) 8: 505

continental drift *see also* plate tectonics; sea-floor spreading; *see also under* tectonophysics *under* Atlantic region

continental shelf *see also under* oceanography *under* Irish Sea; Nova Scotia

continental shelf—oceanography
sedimentation: Mixing of siliciclastic and carbonate sediments in shallow shelf environments
(Mount, Jeffrey F.) 7: 432

continental slope *see also* continental shelf; *see also under* oceanography *under* Atlantic Ocean; Japan; New Jersey

Coral Sea—oceanography
sedimentation: Relative rates of tectonic uplift as determined from episodic turbidite deposition in marine basins
(Klein, George de Vries) 1: 48

Cretaceous *see also under* geochronology *under* Quebec; *see also under* stratigraphy *under* Italy; symposia

Cretaceous—stratigraphy
boundary: Spheroids at the Cretaceous-Tertiary boundary are altered impact droplets of basaltic composition; discussion and reply
(Bohor, Bruce, *et al.*) 11: 695

paleo-oceanography: Low productivity and slow deep-water circulation in Mid-Cretaceous oceans
(Bralower, Timothy J., *et al.*) 10: 614
paleoclimatology: Climatic implications of the variable obliquity explanation of Cretaceous-Paleogene high-latitude floras
(Barron, Eric J.) 10: 595
— Cretaceous climates
(Barron, Eric J., *et al.*) 6: 377
— Temperature and biotic crises in the marine realm
(Stanley, Steven M.) 4: 205

crust *see also under* seismology *under* Appalachians; Atlantic Ocean; California; *see also under* tectonophysics *under* Alps; Appalachians; Arabian Peninsula; Archean; Canadian Shield; Egypt; Iceland; New England; Newfoundland; North America; Northwest Territories

crust—properties
elastic properties: Seismic reflectivity of mylonite zones in the crust
(Fountain, David M., *et al.*) 4: 195

crust—theoretical studies
geothermal systems: Adiabatic decompression of aqueous solutions; applications to hydrothermal fluid migration in the crust
(Wood, Scott A., *et al.*) 12: 707

crust—thickness
continental crust: Primordial degassing, lithosphere thicknesss, and the origin of komatiites
(Warren, Paul H.) 6: 335
evolution: Early poststabilization sedimentation and later growth of shields
(Rogers, John J. W., *et al.*) 10: 607

crystal chemistry *see also* crystal growth; minerals

crystal chemistry—aluminosilicates
coordination: Melting in feldspar-bearing systems to high pressures and the structures of aluminosilicate liquids
(Boettcher, Art, *et al.*) 4: 202

crystal chemistry—orthosilicates
phase equilibria: Light-rare-earth-element zoning in sphene and allanite during granitoid fractionation
(Sawka, Wayne N., *et al.*) 3: 131

crystal chemistry—orthosilicates, garnet group
phase equilibria: Water content of mantle garnets
(Aines, Roger D., *et al.*) 12: 720

crystal growth *see also* crystal chemistry; minerals

crystal growth—orthosilicates, epidote group
phase equilibria: Magmatic epidote and its petrologic significance
(Zen, E-an, *et al.*) 9: 515

crystal growth—oxides
magnetite: Ultrafine-grained magnetite in deep-sea sediments; possible bacterial magnetofossils
(Kirschvink, Joseph L., *et al.*) 9: 559

crystal structure *see also* crystal chemistry; crystal growth; minerals

Cyprus—tectonophysics
plate tectonics: Model for the origin of the Troodos Massif, Cyprus, and other Mideast ophiolites
(Moores, E. M., *et al.*) 8: 500

deep seismic sounding *see under* crust *under* seismology

deformation *see also* geophysics; structural analysis

deformation—field studies
compression: Compressive strains generated by normal faulting
(Brumbaugh, David S.) 8: 491
fractures: Deformation of Permian strata overlying a zone of salt dissolution and collapse in the Texas Panhandle
(Goldstein, A. G., *et al.*) 5: 314
shear: Borrego Springs-Santa Rosa mylonite zone; a Late Cretaceous west-directed thrust in Southern California
(Simpson, Carol) 1: 8
— Shear band foliation as an indicator of sense of shear; field observations in central Spain
(Weijermars, Ruud, *et al.*) 10: 603
strain: Crustal warping in coastal Maine
(Anderson, Walter A., *et al.*) 11: 677
stress: Stress orientations during Oligocene volcanism in Trans-Pecos Texas; timing the transition from Laramide compression to Basin and Range tension
(Price, Jonathan G., *et al.*) 4: 238

deformation—theoretical studies
tensile strength: Differential stress magnitudes during regional deformation and metamorphism; upper bound imposed by tensile fracturing; discussion and reply
(Tharp, Thomas M., *et al.*) 1: 56

deposition of ores *see* mineral deposits, genesis

Devonian *see also under* geochronology *under* California; *see also under* stratigraphy *under* New York; Scotland

Devonian—stratigraphy
paleoclimatology: Temperature and biotic crises in the marine realm
(Stanley, Steven M.) 4: 205

diagenesis *see also* sedimentation

diagenesis—cementation
intertidal environment: Salina-margin tepees, pisoliths, and aragonite cements, Lake MacLeod, Western Australia; their significance in interpreting ancient analogs
(Handford, C. Robertson, *et al.*) 9: 523

diagenesis—dolomitization
controls: Petrologic and geochemical constraints on the origin of subsurface dolomite, Enewetak Atoll; an example of dolomitization by normal seawater
(Saller, Arthur H.) 4: 217
experimental studies: Dolomite selectivity and mimic replacement
(Bullen, Susan B., *et al.*) 11: 655

diagenesis—geochemistry
geochemical indicators: C/S method for distinguishing freshwater from marine sedimentary rocks
(Berner, Robert A., *et al.*) 6: 365
phase equilibria: Graphite-CH_4-H_2O-CO_2 equilibria at low-grade metamorphic conditions
(Holloway, John R.) 8: 455
reactions: Problem of secondary porosity; Frio Formation (Oligocene), Texas Gulf Coast
(Lundegard, Paul D., *et al.*) 7: 399

diagenesis—processes
calcification: Calcification of cyanobacterial mats in Solar Lake, Sinai
(Lyons, W. M. Berry, *et al.*) 10: 623
calcitization: Transformation of aragonite-dominated lime muds to microcrystalline limestones
(Lasemi, Zakaria, *et al.*) 7: 420

diastrophism *see* epeirogeny; orogeny; tectonics

diatom flora *see under* algal flora

dikes *see under* intrusions

dolomitization *see under* diagenesis

dolostone *see also under* carbonate rocks *under* sedimentary rocks

domes *see under* style *under* folds

earthquakes *see under* seismology; *see also* seismology; *see also under* seismology *under* Alaska; California; Eastern U.S.; Idaho; Maine; South Carolina; Virginia

Eastern Hemisphere *see also* Antarctic Ocean; Antarctica; Arctic Ocean; Atlantic Ocean; Europe; Indian Ocean; USSR

Eastern U.S. *see also* Florida; Georgia; Maine; New England; New Jersey; New York; North Carolina; South Carolina; Virginia

Eastern U.S.—seismology
earthquakes: Seismicity and suspect terranes in the southeastern United States
(Wheeler, Russell L., *et al.*) 6: 323

ecology—environment
shallow-water environment: Mixing of siliciclastic and carbonate sediments in shallow shelf environments
(Mount, Jeffrey F.) 7: 432

economic geology—symposia
lead-zinc deposits: Mississippi valley-type lead-zinc deposits
(Pratt, Walden P.) 3: 184

Egypt—geomorphology
eolian features: Shapes of streamlined islands on Earth and Mars; experiments and analyses of the minimum-drag form; discussion and reply
(Murty, T. S., *et al.*) 9: 569
Egypt—sedimentary petrology
diagenesis: Calcification of cyanobacterial mats in Solar Lake, Sinai
(Lyons, W. M. Berry, *et al.*) 10: 623
Egypt—stratigraphy
Proterozoic: Evolution of the Kid Group, Southeast Sinai Peninsula; thrusts, melanges, and implications for accretionary tectonics during the late Proterozoic of the Arabian-Nubian Shield
(Shimron, Aryeh E.) 4: 242
— Late Precambrian rifting and crustal evolution in the Northeast Desert of Egypt
(Stern, Robert J., *et al.*) 3: 168
Egypt—structural geology
tectonics: Evolution of the Kid Group, Southeast Sinai Peninsula; thrusts, melanges, and implications for accretionary tectonics during the late Proterozoic of the Arabian-Nubian Shield
(Shimron, Aryeh E.) 4: 242
Egypt—tectonophysics
crust: Late Precambrian rifting and crustal evolution in the Northeast Desert of Egypt
(Stern, Robert J., *et al.*) 3: 168
engineering geology *see also* deformation; geodesy; geophysical methods; ground water; rock mechanics
environmental geology *see also* ecology
Eocene *see also under* stratigraphy *under* Arctic Ocean; Atlantic Ocean; Wyoming
Eocene—geochronology
time scales: Toward an objective Phanerozoic time scale
(Carr, Paul F., *et al.*) 5: 274
epeirogeny *see also* orogeny; tectonics
epeirogeny—Pleistocene
Florida: Origin of the epeirogenic uplift of Pliocene-Pleistocene beach ridges in Florida and development of the Florida karst
(Opdyke, Neil D., *et al.*) 4: 226
eruptive rocks *see* igneous rocks
Europe *see also* Alps; France; Great Britain; Greece; Iceland; Portugal; Pyrenees; Scotland; Spain; United Kingdom
Europe—tectonophysics
plate tectonics: Paleozoic evolution of the Armorica Plate on the basis of paleomagnetic data
(Perroud, Herve, *et al.*) 10: 579
experimental studies *see under* dolomitization *under* diagenesis; *see under* clay mineralogy; geophysics; *see under* magmas *under* phase equilibria; *see under* melting *under* phase equilibria; *see under* orthosilicates, garnet group *under* phase equilibria; *see under* volcanic rocks *under* igneous rocks
Far East *see also* the individual countries
faulting *see* faults
faults *see also* folds; tectonics
faults—displacements
active faults: Rates of late Cenozoic tectonism in the Vallecito-Fish Creek Basin, western Imperial Valley, California; discussion and reply
(Lowman, Paul D., Jr., *et al.*) 5: 319
— Sunda Strait and Central Sumatra Fault
(Huchon, P., *et al.*) 11: 668
— Surface faulting accompanying the Borah Peak earthquake, central Idaho
(Crone, Anthony J., *et al.*) 11: 664
normal faults: Compressive strains generated by normal faulting
(Brumbaugh, David S.) 8: 491
— Direction of absolute movement along the boundary faults of the Basin and Range-Colorado Plateau margin
(Hamblin, W. K.) 2: 116
— Metamorphic core complexes of Cordilleran type in the Cyclades, Aegean Sea, Greece
(Lister, Gordon S., *et al.*) 4: 221
— Pogallo Line, South Alps, northern Italy; an intermediate crustal level, low-angle normal fault?
(Hodges, K. V., *et al.*) 3: 151
— Reinterpretation of Lime Peak thrust as a low-angle normal fault; implications for the tectonics of southeastern Arizona
(Dickinson, William R.) 10: 610
— Relationship of late Quaternary fault scarps to subjacent faults, eastern Great Basin, Utah
(Crone, Anthony J., *et al.*) 5: 292
— Role of tectonic denudation in warping and uplift of low-angle normal faults
(Spencer, Jon E.) 2: 95
overthrust faults: Overthrust model for the Sierra Nevada
(Moores, E. M., *et al.*) 7: 416
strike-slip faults: British paleomagnetism, Iapetus Ocean, and the Great Glen Fault
(Briden, J. C., *et al.*) 7: 428
— History of recurrent activity along a major fault in northeastern Mexico
(McKee, James W., *et al.*) 2: 103
— Recurrent Holocene strike-slip faulting, Pyramid Lake fault zone, western Nevada
(Anderson, Larry W., *et al.*) 11: 681
— Role of synsedimentary strike-slip faults in the formation of Moroccan Triassic basins
(Laville, Edgard, *et al.*) 7: 424
thrust faults: Borrego Springs-Santa Rosa mylonite zone; a Late Cretaceous west-directed thrust in Southern California
(Simpson, Carol) 1: 8
— Evidence for Late Devonian movement within the Roberts Mountains Allochthon, Roberts Mountains, Nevada
(Murphy, M. A., *et al.*) 1: 20
— Evidence for Late Devonian movement within the Roberts Mountains Allochthon, Roberts Mountains, Nevada; discussion and reply
(Ketner, Keith, *et al.*) 7: 445
— Evolution of the Kid Group, Southeast Sinai Peninsula; thrusts, melanges, and implications for accretionary tectonics during the late Proterozoic of the Arabian-Nubian Shield
(Shimron, Aryeh E.) 4: 242
— Recent studies indicate that major structures in northeastern Nevada and the Golconda Thrust in north-central Nevada are of Jurassic or Cretaceous age
(Ketner, Keith B.) 8: 483
— Sedimentary basins formed and carried piggyback on active thrust sheets
(Ori, G. G., *et al.*) 8: 475
— Terminal fold-belt deformation; relationship of Mid-Carboniferous megakinks in the Tasman fold belt to coeval thrusts in cratonic Australia
(Powell, Christopher M.) 9: 546
transcurrent faults: Evidence for a margin-truncating transcurrent fault (pre-late Eocene) in western Washington
(Johnson, Samuel Y.) 9: 538
— Evidence for early Tertiary remagnetization of Devonian rocks from the Orcadian Basin, northern Scotland, and associated transcurrent fault motion
(Cisowski, Stanley M.) 6: 369
faults—distribution
Alabama: Truncation of the Appalachian Piedmont beneath the coastal plain of Alabama; evidence from new magnetic data
(Horton, J. Wright, Jr., *et al.*) 1: 51
Appalachians: Reprocessed COCORP Southern Appalachian reflection data; root zone to coastal plain; discussion and reply
(Cook, Frederick A., *et al.*) 4: 249
deep-seated structures: Basement control of Tertiary intrusions and associated mineral deposits along Tijeras-Canoncito fault system, New Mexico
(Woodward, Lee A.) 9: 531
sedimentary rocks: Evidence against large-scale strike-slip separation of Paleozoic strata along the Richardson-Hess fault system, northern Canadian Cordillera
(Cecile, M. P.) 7: 403

faults—effects
earthquakes: COCORP seismic profiles near Coalinga, California; subsurface structure of the western Great Valley
(Fielding, Eric, *et al.*) 5: 268
mylonites: Seismic reflectivity of mylonite zones in the crust
(Fountain, David M., *et al.*) 4: 195
shear zones: Shear band foliation as an indicator of sense of shear; field observations in central Spain
(Weijermars, Ruud, *et al.*) 10: 603

faults—interpretation
classification: Fault-related rocks; suggestions for terminology
(Wise, Donald U., *et al.*) 7: 391

faults—systems
grabens: Tectonic control of Triassic sedimentation in southern New Brunswick; local and regional implications
(Nadon, G. C., *et al.*) 10: 619
rift zones: Cenozoic rift formation in the northern Caribbean
(Mann, Paul, *et al.*) 12: 732

fission-track dating *see under* geochronology

Florida—hydrogeology
springs: Origin of the epeirogenic uplift of Pliocene-Pleistocene beach ridges in Florida and development of the Florida karst
(Opdyke, Neil D., *et al.*) 4: 226

Florida—sedimentary petrology
diagenesis: Transformation of aragonite-dominated lime muds to microcrystalline limestones
(Lasemi, Zakaria, *et al.*) 7: 420

Florida—structural geology
isostasy: Origin of the epeirogenic uplift of Pliocene-Pleistocene beach ridges in Florida and development of the Florida karst
(Opdyke, Neil D., *et al.*) 4: 226

fluid inclusions *see also* inclusions

fluorine—geochemistry
magmas: Transport and concentration of molybdenum in granite molybdenite systems; effects of fluorine and sulfur
(Tingle, Tracy N., *et al.*) 3: 156
— Transport and concentration of molybdenum in granite molybdenite systems; effects of fluorine and sulfur; discussion and reply
(Isuk, Edet E., *et al.*) 9: 568

fluvial features *see under* geomorphology

folding *see* folds

folds *see also* faults; foliation; tectonics

folds—mechanics
flexural-slip: Earthquakes and folding, Coalinga, California
(Hill, Mason L.) 12: 711
kink-band structures: Terminal fold-belt deformation; relationship of Mid-Carboniferous megakinks in the Tasman fold belt to coeval thrusts in cratonic Australia
(Powell, Christopher M.) 9: 546
slump structures: Development of foliation and fold interference patterns produced by sedimentary processes
(Tobisch, Othmar T.) 7: 441

folds—orientation
nappes: Evidence for nappe development during the early Proterozoic Penokean Orogeny, Minnesota
(Holst, Timothy B.) 3: 135
— Overthrust model for the Sierra Nevada
(Moores, E. M., *et al.*) 7: 416
recumbent folds: Evolution of the Kid Group, Southeast Sinai Peninsula; thrusts, melanges, and implications for accretionary tectonics during the late Proterozoic of the Arabian-Nubian Shield
(Shimron, Aryeh E.) 4: 242

folds—style
antiform folds: Role of tectonic denudation in warping and uplift of low-angle normal faults
(Spencer, Jon E.) 2: 95
domes: Metamorphic core complexes of Cordilleran type in the Cyclades, Aegean Sea, Greece
(Lister, Gordon S., *et al.*) 4: 221

foliation *see also* folds; structural analysis

foliation—genesis
shear cleavage: Shear band foliation as an indicator of sense of shear; field observations in central Spain
(Weijermars, Ruud, *et al.*) 10: 603

foliation—style
cleavage: Development of foliation and fold interference patterns produced by sedimentary processes
(Tobisch, Othmar T.) 7: 441
— Solution cleavage and its relationship to major structures in the Idaho-Utah-Wyoming thrust belt
(Mitra, Gautam, *et al.*) 6: 354

foraminifera *see also* foraminifers

foraminifers—biostratigraphy
Cenozoic: Baffin Bay; present-day analog of the central Arctic during late Pliocene to mid-Pleistocene time; discussion and reply
(Kellogg, Thomas B., *et al.*) 6: 378
— Model for the origin of the Yakutat Block, an accreting terrane in the northern Gulf of Alaska; discussions and replies
(Plafker, George, *et al.*) 9: 563
changes of level: Holocene rise of relative sea level at Sable Island, Nova Scotia, Canada
(Scott, D. B., *et al.*) 3: 173
Eocene: Eocene-Oligocene boundary; biostratigraphic recognition and gradual paleoceanographic change at DSDP Site 549
(Snyder, Scott W., *et al.*) 2: 112

foraminifers—ecology
shallow-water environment: Mixing of siliciclastic and carbonate sediments in shallow shelf environments
(Mount, Jeffrey F.) 7: 432

foraminifers—paleoecology
Oligocene: Middle Oligocene cooling from Equatorial Pacific DSDP Site 77B
(Keigwin, Lloyd, *et al.*) 1: 16

fossils *see* appropriate fossil group

fossils, problematic *see* problematic fossils

foundations *see also* rock mechanics

fractures—genesis
tension: Differential stress magnitudes during regional deformation and metamorphism; upper bound imposed by tensile fracturing; discussion and reply
(Tharp, Thomas M., *et al.*) 1: 56

fractures—style
joints: Deformation of Permian strata overlying a zone of salt dissolution and collapse in the Texas Panhandle
(Goldstein, A. G., *et al.*) 5: 314

France—geochronology
Triassic: Fission-track evidence for Late Triassic oceanic crust in the French Occidental Alps
(Carpena, Joelle, *et al.*) 2: 108

France—tectonophysics
plate tectonics: Paleozoic evolution of the Armorica Plate on the basis of paleomagnetic data
(Perroud, Herve, *et al.*) 10: 579

gabbros *see under* igneous rocks

genesis of ore deposits *see* mineral deposits, genesis

geochemistry—geochemical cycle
carbon: Low productivity and slow deep-water circulation in Mid-Cretaceous oceans
(Bralower, Timothy J., *et al.*) 10: 614

geochemistry—processes
diffusion: Calcium diffusion; a new dating method for archeological materials
(Waddell, Carol, *et al.*) 1: 24
— Model for K-bentonite formation; evidence from zoned K-bentonites in the Disturbed Belt, Montana
(Altaner, Stephen P., *et al.*) 7: 412
reduction: Calcification of cyanobacterial mats in Solar Lake, Sinai
(Lyons, W. M. Berry, *et al.*) 10: 623

geochemistry—properties
thermodynamic properties: Adiabatic decompression of aqueous solutions; applications to hydrothermal fluid migration in the crust
(Wood, Scott A., *et al.*) 12: 707
geochemistry—surveys
California: Changing mercury anomalies in Long Valley, California; indication for magma movement or seismic activity
(Varekamp, Johan C., *et al.*) 5: 283
geochronology *see also* absolute age
geochronology—fission-track dating
apatite: Geochronology of the Monteregian Hills alkaline igneous province, Quebec
(Eby, G. Nelson) 8: 468
— Uplift rate of Adirondack anorthosite measured by fission-track analysis of apatite; discussion and reply
(Morgan, Paul, *et al.*) 2: 124
ophiolite: Fission-track evidence for Late Triassic oceanic crust in the French Occidental Alps
(Carpena, Joelle, *et al.*) 2: 108
geochronology—methods
diffusion: Calcium diffusion; a new dating method for archeological materials
(Waddell, Carol, *et al.*) 1: 24
geochronology—paleomagnetism
glaciation: Glacial and nonglacial sediments of Matuyama paleomagnetic age on Banks Island, Canadian Arctic Archipelago
(Vincent, Jean-Serge, *et al.*) 3: 139
magnetostratigraphy: Mono Lake geomagnetic excursion found at Summer Lake, Oregon
(Negrini, Robert M., *et al.*) 11: 643
geochronology—tephrochronology
active faults: Recurrent Holocene strike-slip faulting, Pyramid Lake fault zone, western Nevada
(Anderson, Larry W., *et al.*) 11: 681
correlation: Dispersed rhyolitic tephra from New Zealand in deep-sea sediments of the Southern Ocean
(Kyle, Philip R., *et al.*) 8: 487
geochronology—time scales
Ordovician: The Decade of North American Geology 1983 geologic time scale; discussion and reply
(Ross, Reuben J., Jr., *et al.*) 8: 505
Phanerozoic: The Decade of North American Geology 1983 geologic time scale; discussion and reply
(Wilson, Edward Norman, *et al.*) 4: 253
— Toward an objective Phanerozoic time scale
(Carr, Paul F., *et al.*) 5: 274
Precambrian: The Decade of North American Geology 1983 geologic time scale; discussion and reply
(Wilson, Edward Norman, *et al.*) 4: 253
geochronology—varves
glacial lakes: Periodic floods from glacial Lake Missoula into the Sanpoil Arm of glacial Lake Columbia, northeastern Washington
(Atwater, Brian F.) 8: 464
geodesy—surveys
Maine: Crustal warping in coastal Maine
(Anderson, Walter A., *et al.*) 11: 677
geologic hazards *see also under* environmental geology *under* Hawaii
geologic thermometry *see under* burial metamorphism *under* metamorphism
geologic time *see* absolute age; geochronology
geology—practice
women: Status of women in the earth sciences
(Moody, Judith B.) 3: 191
geomorphology *see also* glacial geology
geomorphology—fluvial features
braided streams: William River; an outstanding example of channel widening and braiding caused by bed-load addition
(Smith, Norman D., *et al.*) 2: 78
islands: Shapes of streamlined islands on Earth and Mars; experiments and analyses of the minimum-drag form; discussion and reply
(Murty, T. S., *et al.*) 9: 569
geomorphology—impact features
craters: Origin of impact craters; ideas and experiments of Hooke, Gilbert, and Wegener
(Drake, Ellen T., *et al.*) 7: 408
geomorphology—landform description
fault scarps: Surface faulting accompanying the Borah Peak earthquake, central Idaho
(Crone, Anthony J., *et al.*) 11: 664
geomorphology—landform evolution
tectonic controls: Origin of the epeirogenic uplift of Pliocene-Pleistocene beach ridges in Florida and development of the Florida karst
(Opdyke, Neil D., *et al.*) 4: 226
— Relationship of late Quaternary fault scarps to subjacent faults, eastern Great Basin, Utah
(Crone, Anthony J., *et al.*) 5: 292
geomorphology—mass movements
avalanches: Catastrophic debris avalanche from ancestral Mount Shasta Volcano, California
(Crandell, D. R., *et al.*) 3: 143
— Olokele rock avalanche, island of Kauai, Hawaii
(Jones, B. L., *et al.*) 4: 209
geomorphology—volcanic features
debris flows: Flank failure-directed blast eruption at Soufriere, Guadeloupe, French West Indies; a 3,000-yr-old Mt. St. Helens?
(Boudon, Georges, *et al.*) 6: 350
landform evolution: K-Ar dating of the Cima volcanic field, eastern Mojave Desert, California; late Cenozoic volcanic history and landscape evolution
(Dohrenwend, John C., *et al.*) 3: 163
geophysical methods—seismic methods
interpretation: Landward-dipping reflectors in accretionary wedges; active dewatering conduits?
(Cloos, Mark) 9: 519
geophysical surveys *see under* Alabama; Atlantic Ocean; California; Pacific Ocean; Utah; *see* acoustical surveys *under* geophysical surveys *under* Pacific Ocean; *see* magnetic surveys *under* geophysical surveys *under* Alabama; *see* seismic surveys *under* geophysical surveys *under* Atlantic Ocean; California; Utah; *see also* geophysical methods
geophysics *see also* deformation
geophysics—experimental studies
explosions: Volcanic and stratospheric dustlike particles produced by experimental water-melt interactions
(Wohletz, Kenneth H., *et al.*) 10: 591
geophysics—theoretical studies
geothermal systems: Adiabatic decompression of aqueous solutions; applications to hydrothermal fluid migration in the crust
(Wood, Scott A., *et al.*) 12: 707
Georgia—structural geology
isostasy: Origin of the epeirogenic uplift of Pliocene-Pleistocene beach ridges in Florida and development of the Florida karst
(Opdyke, Neil D., *et al.*) 4: 226
geosynclines *see also* orogeny; tectonics
geothermics *see* heat flow
glacial geology *see also* geomorphology
glacial geology—ancient ice ages
Proterozoic: Subsidence analysis of the Cordilleran miogeocline; implications for timing of late Proterozoic rifting and amount of extension; discussion and reply
(Link, Paul Karl, *et al.*) 11: 699
glacial geology—glacial features
glacial lakes: Periodic floods from glacial Lake Missoula into the Sanpoil Arm of glacial Lake Columbia, northeastern Washington
(Atwater, Brian F.) 8: 464
moraines: Probability of moraine survival in a succession of glacial advances
(Gibbons, Anthony B., *et al.*) 6: 327

glacial geology—glaciation
deposition: Glaciomarine sediments of the Isle of Man as a key to late Pleistocene stratigraphic investigations in the Irish Sea basin
(Eyles, Carolyn Hope, *et al.*) 6: 359
geochronology: Glacial and nonglacial sediments of Matuyama paleomagnetic age on Banks Island, Canadian Arctic Archipelago
(Vincent, Jean-Serge, *et al.*) 3: 139
ice movement: Late Tertiary history of the Antarctic ice sheet; evidence form the dry valleys
(Denton, George H., *et al.*) 5: 263
glacial geology—glaciers
ice sheets: Cenozoic marine sedimentation and ice-volume variation on the East Antarctic Craton
(Webb, P. N., *et al.*) 5: 287
glacial lakes *see under* glacial features *under* glacial geology
glaciation *see under* glacial geology
glaciers *see under* glacial geology
global tectonics *see* plate tectonics
grabens *see under* systems *under* faults
graded bedding *see under* turbidity current structures *under* sedimentary structures
granites *see under* igneous rocks
Gr • Basin *see also* the individual states
Great Basin—structural geology
neotectonics: Relationship of late Quaternary fault scarps to subjacent faults, eastern Great Basin, Utah
(Crone, Anthony J., *et al.*) 5: 292
Great Britain *see also* Scotland
Great Britain—stratigraphy
Paleozoic: British paleomagnetism, Iapetus Ocean, and the Great Glen Fault
(Briden, J. C., *et al.*) 7: 428
Great Lakes region *see also* the individual states and provinces
Great Plains *see also* the individual states and provinces
Greece—structural geology
tectonics: Metamorphic core complexes of Cordilleran type in the Cyclades, Aegean Sea, Greece
(Lister, Gordon S., *et al.*) 4: 221
Greenland—geochronology
Archean: Rb-Sr isotope systematics and contrasting histories of late Archean gneisses, West Greenland
(Grant, N. K., *et al.*) 10: 599
ground water—surveys
Atlantic Coastal Plain: Spring sapping on the lower continental slope, offshore New Jersey
(Robb, James M.) 5: 278
Guadeloupe—volcanology
La Grande Soufriere: Flank failure-directed blast eruption at Soufriere, Guadeloupe, French West Indies; a 3,000-yr-old Mt. St. Helens?
(Boudon, Georges, *et al.*) 6: 350
Gulf Coastal Plain *see also* the individual states and countries
Gulf Coastal Plain—structural geology
faults: Truncation of the Appalachian Piedmont beneath the coastal plain of Alabama; evidence from new magnetic data
(Horton, J. Wright, Jr., *et al.*) 1: 51
Gulf of Mexico—stratigraphy
Paleogene: Deep-sea erosional unconformity in the southeastern Gulf of Mexico; discussion and reply
(Patmore, S. J., *et al.*) 4: 248
Hawaii—engineering geology
slope stability: Olokele rock avalanche, island of Kauai, Hawaii
(Jones, B. L., *et al.*) 4: 209
Hawaii—environmental geology
geologic hazards: Olokele rock avalanche, island of Kauai, Hawaii
(Jones, B. L., *et al.*) 4: 209
Hawaii—petrology
volcanism: Hawaiian hotspot volcanism mainly during geomagnetic normal intervals
(Moberly, Ralph, *et al.*) 8: 459
heat flow—interpretation
mantle: Primordial degassing, lithosphere thicknesss, and the origin of komatiites
(Warren, Paul H.) 6: 335
Himalayas *see also* the individual countries
Holocene *see also under* geochronology *under* Nevada; *see also under* stratigraphy *under* Nova Scotia
Holocene—stratigraphy
archaeology: Calcium diffusion; a new dating method for archeological materials
(Waddell, Carol, *et al.*) 1: 24
hydrogeology *see also* ground water
hydrology *see also* ground water
hydrothermal alteration *see under* processes *under* metasomatism
Iberian Peninsula *see also* Portugal; Spain
ice ages *see* glacial geology
Iceland—tectonophysics
crust: Frequent shifts of the volcanic zone in Iceland
(Helgason, Johann) 4: 212
Iceland—volcanology
Torfajokull: Torfajokull; a volcano dominated by magma mixing
(McGarvie, David W) 11: 685
ichnofossils—occurrence
burrows: Abundant and diverse early Paleozoic infauna indicated by the stratigraphic record
(Miller, Molly Fritz, *et al.*) 1: 40
— Abundant and diverse early Paleozoic infauna indicated by the stratigraphic record; discussion and reply
(Pickerill, Ronald K., *et al.*) 9: 567
Idaho—petrology
intrusions: Casto ring zone; a 4,500-km² fossil hydrothermal system in the Challis volcanic field, central Idaho
(Criss, R. E., *et al.*) 6: 331
Idaho—seismology
earthquakes: Surface faulting accompanying the Borah Peak earthquake, central Idaho
(Crone, Anthony J., *et al.*) 11: 664
Idaho—structural geology
structural analysis: Solution cleavage and its relationship to major structures in the Idaho-Utah-Wyoming thrust belt
(Mitra, Gautam, *et al.*) 6: 354
igneous rocks *see also* inclusions; intrusions; lava; magmas; metamorphic rocks; metasomatism; phase equilibria
igneous rocks—alkalic composition
intrusive rocks: Geochronology of the Monteregian Hills alkaline igneous province, Quebec
(Eby, G. Nelson) 8: 468
igneous rocks—basalts
genesis: Physical and chemical constraints on the evolution of the Columbia River Basalt
(Hooper, P. R.) 8: 495
igneous rocks—gabbros
anorthosite: Anorthosite genesis; the mid-ocean ridge analogue
(Flower, Martin F. J.) 11: 651
— Origin and age of Adirondack anorthosites re-evaluated with Nd isotopes; discussion and reply
(Parrish, Randall R., *et al.*) 6: 380
igneous rocks—geochemistry
isotopes: Casto ring zone; a 4,500-km² fossil hydrothermal system in the Challis volcanic field, central Idaho
(Criss, R. E., *et al.*) 6: 331
igneous rocks—granites
geochemistry: Light-rare-earth-element zoning in sphene and allanite during granitoid fractionation
(Sawka, Wayne N., *et al.*) 3: 131
igneous rocks—peridotites
geochemistry: Mantle metasomatism; the REE story
(Wilshire, H. G.) 7: 395

igneous rocks—plutonic rocks
mineral composition: Magmatic epidote and its petrologic significance
(Zen, E-an, *et al.*) 9: 515

igneous rocks—pyroclastics
ash-flow tuff: Rare-element-enriched, S-type ash-flow tuffs containing phenocrysts of muscovite, andalusite, and sillimanite, southeastern Peru
(Noble, Donald C., *et al.*) 1: 35
classification: Mount St. Helens 1980 and Mount Pelee 1902; flow or surge?; discussions and reply
(Hoblitt, Richard P., *et al.*) 11: 692
distribution: Volcanological study of the great Tambora eruption of 1815
(Self, S., *et al.*) 11: 659
tuff: John Day Formation of Oregon; a distal record of early Cascade volcanism
(Robinson, Paul T., *et al.*) 4: 229

igneous rocks—rhyolites
genesis: Torfajokull; a volcano dominated by magma mixing
(McGarvie, David W) 11: 685

igneous rocks—ultramafics
kimberlite: Siberian geotherm based on lherzolite xenoliths from the Udachnaya Kimberlite, USSR
(Boyd, F. R.) 9: 528
komatiite: Primordial degassing, lithosphere thicknesss, and the origin of komatiites
(Warren, Paul H.) 6: 335
ophiolite: Model for the origin of the Troodos Massif, Cyprus, and other Mideast ophiolites
(Moores, E. M., *et al.*) 8: 500

igneous rocks—volcanic rocks
distribution: Catastrophic debris avalanche from ancestral Mount Shasta Volcano, California
(Crandell, D. R., *et al.*) 3: 143
experimental studies: A magmatic geohygrometer; application to Mount St. Helens and other dacitic magmas
(Merzbacher, Celia, *et al.*) 10: 587
genesis: Geodynamic significance of Late Triassic to Early Cretaceous volcanic sequences of Vizcaino Peninsula and Cedros Island, Baja California, Mexico; discussion and reply
(Moore, Thomas E., *et al.*) 11: 697

impact features *see under* geomorphology

incertae sedis *see* problematic fossils

inclusions—mineral inclusions
garnet group: Water content of mantle garnets
(Aines, Roger D., *et al.*) 12: 720

inclusions—xenoliths
alkali basalts: Mantle metasomatism; the REE story
(Wilshire, H. G.) 7: 395
garnet lherzolite: Siberian geotherm based on lherzolite xenoliths from the Udachnaya Kimberlite, USSR
(Boyd, F. R.) 9: 528
tholeiite: Torfajokull; a volcano dominated by magma mixing
(McGarvie, David W) 11: 685

Indian Ocean—tectonophysics
sea-floor spreading: Model for the origin of the Troodos Massif, Cyprus, and other Mideast ophiolites
(Moores, E. M., *et al.*) 8: 500

Indonesia—tectonophysics
plate tectonics: Sunda Strait and Central Sumatra Fault
(Huchon, P., *et al.*) 11: 668

Indonesia—volcanology
Tambora: Volcanological study of the great Tambora eruption of 1815
(Self, S., *et al.*) 11: 659

intrusions *see also* igneous rocks; metamorphism; metasomatism

intrusions—contact metamorphism
hydrothermal alteration: Casto ring zone; a 4,500-km² fossil hydrothermal system in the Challis volcanic field, central Idaho
(Criss, R. E., *et al.*) 6: 331

intrusions—dikes
contact metamorphism: Mantle metasomatism; the REE story
(Wilshire, H. G.) 7: 395
distribution: Detection of subsurface features in Seasat radar images of Means Valley, Mojave Desert, California
(Blom, Ronald G., *et al.*) 6: 346
— Juxtaposed Mesozoic diabase dike sets from the Carolinas; a preliminary assessment; discussion and reply
(Butler, J. Robert, *et al.*) 8: 504
orientation: Stress orientations during Oligocene volcanism in Trans-Pecos Texas; timing the transition from Laramide compression to Basin and Range tension
(Price, Jonathan G., *et al.*) 4: 238

intrusions—geochemistry
trace elements: Light-rare-earth-element zoning in sphene and allanite during granitoid fractionation
(Sawka, Wayne N., *et al.*) 3: 131

intrusions—pipes
kimberlite: Siberian geotherm based on lherzolite xenoliths from the Udachnaya Kimberlite, USSR
(Boyd, F. R.) 9: 528

intrusions—plutons
emplacement: Basement control of Tertiary intrusions and associated mineral deposits along Tijeras-Canoncito fault system, New Mexico
(Woodward, Lee A.) 9: 531
petrology: Magmatic epidote and its petrologic significance
(Zen, E-an, *et al.*) 9: 515

Invertebrata *see also* Archaeocyatha; ichnofossils; Mollusca; problematic fossils; Trilobita

invertebrates *see also* brachiopods; conodonts; foraminifers; mollusks; trilobites

invertebrates—biogeography
Proterozoic: Ediacarian fossils from the Carolina slate belt, Stanly County, North Carolina
(Gibson, Gail G., *et al.*) 7: 387

invertebrates—paleoecology
Paleozoic: Abundant and diverse early Paleozoic infauna indicated by the stratigraphic record
(Miller, Molly Fritz, *et al.*) 1: 40

Irish Sea—oceanography
continental shelf: Glaciomarine sediments of the Isle of Man as a key to late Pleistocene stratigraphic investigations in the Irish Sea basin
(Eyles, Carolyn Hope, *et al.*) 6: 359

isostasy *see also* epeirogeny; *see also under* structural geology *under* Florida; Georgia; Southwestern U.S.; *see also under* tectonophysics *under* Canadian Shield; North America

isotope dating *see* absolute age

isotopes *see also* absolute age; geochronology

isotopes—carbon
C-13/C-12: Problem of secondary porosity; Frio Formation (Oligocene), Texas Gulf Coast
(Lundegard, Paul D., *et al.*) 7: 399

isotopes—foraminifers
tests: Middle Oligocene cooling from Equatorial Pacific DSDP Site 77B
(Keigwin, Lloyd, *et al.*) 1: 16

isotopes—neodymium
Nd-144/Nd-143: Origin and age of Adirondack anorthosites re-evaluated with Nd isotopes; discussion and reply
(Parrish, Randall R., *et al.*) 6: 380
— Sm-Nd direct dating of the Collins Bay hydrothermal uranium deposit, Saskatchewan
(Fryer, B. J., *et al.*) 8: 479

isotopes—oxygen
O-18/O-16: Casto ring zone; a 4,500-km² fossil hydrothermal system in the Challis volcanic field, central Idaho
(Criss, R. E., *et al.*) 6: 331

isotopes—sediments
stable isotopes: Salina-margin tepees, pisoliths, and aragonite cements, Lake MacLeod, Western Australia; their significance in interpreting ancient analogs
(Handford. C. Robertson, *et al.*) 9: 523

isotopes—strontium
Sr-87/Sr-86: Petrologic and geochemical constraints on the origin of subsurface dolomite, Enewetak Atoll; an example of dolomitization by normal seawater
(Saller, Arthur H.) 4: 217
— Physical and chemical constraints on the evolution of the Columbia River Basalt
(Hooper, P. R.) 8: 495
— Rubidium-strontium dating of ore deposits hosted by Rb-rich rocks, using calcite and other common Sr-bearing minerals
(Ruiz, Joaquin, *et al.*) 5: 259

isotopes—sulfur
S-34/S-32: Ocean stagnation and ventilation defined by $\delta^{34}S$ secular trends in pyrite and barite, Selwyn Basin, Yukon
(Goodfellow, Wayne D., *et al.*) 10: 583

Italy—stratigraphy
Cretaceous: Magnetostratigraphy of the Jurassic-Cretaceous boundary in the Maiolica Limestone (Umbria, Italy)
(Lowrie, W., *et al.*) 1: 44
— Magnetostratigraphy of the Jurassic-Cretaceous boundary in the Maiolica Limestone (Umbria, Italy); discussion and reply
(Ogg, James G., *et al.*) 11: 701
Jurassic: Magnetostratigraphy of the Jurassic-Cretaceous boundary in the Maiolica Limestone (Umbria, Italy)
(Lowrie, W., *et al.*) 1: 44
— Magnetostratigraphy of the Jurassic-Cretaceous boundary in the Maiolica Limestone (Umbria, Italy); discussion and reply
(Ogg, James G., *et al.*) 11: 701

Italy—structural geology
tectonics: Pogallo Line, South Alps, northern Italy; an intermediate crustal level, low-angle normal fault?
(Hodges, K. V., *et al.*) 3: 151
— Sedimentary basins formed and carried piggyback on active thrust sheets
(Ori, G. G., *et al.*) 8: 475

Jamaica—structural geology
tectonics: Cenozoic rift formation in the northern Caribbean
(Mann, Paul, *et al.*) 12: 732

Japan—oceanography
continental slope: Morphology of Bonin fore-arc submarine canyons
(Taylor, Brian, *et al.*) 12: 724

Japan—stratigraphy
Permian: Late Permian-Early Triassic paleogeography of northern Japan; did Pacific microplates accrete to Japan?
(Choi, Dong Ryong) 12: 728
Triassic: Late Permian-Early Triassic paleogeography of northern Japan; did Pacific microplates accrete to Japan?
(Choi, Dong Ryong) 12: 728

Japan—structural geology
neotectonics: Relative rates of tectonic uplift as determined from episodic turbidite deposition in marine basins
(Klein, George de Vries) 1: 48

Japan—tectonophysics
plate tectonics: Landward-dipping reflectors in accretionary wedges; active dewatering conduits?
(Cloos, Mark) 9: 519

Japan Sea—oceanography
sedimentation: Relative rates of tectonic uplift as determined from episodic turbidite deposition in marine basins
(Klein, George de Vries) 1: 48

joints *see under* style *under* fractures

Jurassic *see also under* stratigraphy *under* Italy

landform description *see under* geomorphology

landform evolution *see under* geomorphology

lava *see also* igneous rocks; magmas

lava—age
absolute age: K-Ar dating of the Cima volcanic field, eastern Mojave Desert, California; late Cenozoic volcanic history and landscape evolution
(Dohrenwend, John C., *et al.*) 3: 163

lava—flow mechanism
pillow lava: Ultrathin lava layers exposed near San Luis Obispo Bay, California
(Moore, James G., *et al.*) 9: 542

lava—genesis
lava flows: John Day Formation of Oregon; a distal record of early Cascade volcanism
(Robinson, Paul T., *et al.*) 4: 229
magmas: Torfajokull; a volcano dominated by magma mixing
(McGarvie, David W) 11: 685
pillow lava: Geodynamic significance of Late Triassic to Early Cretaceous volcanic sequences of Vizcaino Peninsula and Cedros Island, Baja California, Mexico; discussion and reply
(Moore, Thomas E., *et al.*) 11: 697

lava—geochemistry
trace elements: Physical and chemical constraints on the evolution of the Columbia River Basalt
(Hooper, P. R.) 8: 495

lead-zinc deposits *see also under* economic geology *under* Australia; Canada; symposia

lead-zinc deposits—genesis
mississippi valley-type: Mississippi valley-type lead-zinc deposits
(Pratt, Walden P.) 3: 184

Lesser Antilles—petrology
volcanism: Comparison of volcanic production rates and subduction rates in the Lesser Antilles and Central America
(Wadge, G.) 9: 555

Lesser Antilles—volcanology
Mount Pelee: Mount St. Helens 1980 and Mount Pelee 1902; flow or surge?; discussions and reply
(Hoblitt, Richard P., *et al.*) 11: 692

Levant *see* Middle East

lineation *see also* foliation; structural analysis

lunar studies *see* Moon

magmas *see also* igneous rocks; intrusions; lava

magmas—age
absolute age: Geochronology of the Monteregian Hills alkaline igneous province, Quebec
(Eby, G. Nelson) 8: 468

magmas—composition
water: A magmatic geohygrometer; application to Mount St. Helens and other dacitic magmas
(Merzbacher, Celia, *et al.*) 10: 587

magmas—contamination
crust: Rb-Sr isotope systematics and contrasting histories of late Archean gneisses, West Greenland
(Grant, N. K., *et al.*) 10: 599
geochemistry: Rare-element-enriched, S-type ash-flow tuffs containing phenocrysts of muscovite, andalusite, and sillimanite, southeastern Peru
(Noble, Donald C., *et al.*) 1: 35

magmas—evolution
mafic magmas: Anorthosite genesis; the mid-ocean ridge analogue
(Flower, Martin F. J.) 11: 651
plate convergence: Comparison of volcanic production rates and subduction rates in the Lesser Antilles and Central America
(Wadge, G.) 9: 555
processes: Physical and chemical constraints on the evolution of the Columbia River Basalt
(Hooper, P. R.) 8: 495

magmas—genesis
mafic magmas: Continental intra-arc depressions; a nonextensional model for their origin, with a Proterozoic example from Wopmay Orogen (Hildebrand, Robert S., *et al.*) 2: 73

magmas—geochemistry
hybridization: Torfajokull; a volcano dominated by magma mixing (McGarvie, David W) 11: 685
molybdenum: Transport and concentration of molybdenum in granite molybdenite systems; effects of fluorine and sulfur (Tingle, Tracy N., *et al.*) 3: 156
phase equilibria: Magmatic epidote and its petrologic significance (Zen, E-an, *et al.*) 9: 515
rare earths: Light-rare-earth-element zoning in sphene and allanite during granitoid fractionation (Sawka, Wayne N., *et al.*) 3: 131

magmas—properties
physical properties: Melting in feldspar-bearing systems to high pressures and the structures of aluminosilicate liquids (Boettcher, Art, *et al.*) 4: 202
volume: Volcanological study of the great Tambora eruption of 1815 (Self, S., *et al.*) 11: 659

magnesium—geochemistry
shells: Sr, Mg, and Ca chemistry of the skeleton of Nautilus (Crick, Rex E., *et al.*) 2: 99

magnetic surveys *see under* geophysical surveys *under* Alabama

magnetism of rocks and minerals *see* paleomagnetism

Maine—geomorphology
changes of level: Crustal warping in coastal Maine (Anderson, Walter A., *et al.*) 11: 677

Maine—seismology
earthquakes: Crustal warping in coastal Maine (Anderson, Walter A., *et al.*) 11: 677

Maine—stratigraphy
archaeology: Crustal warping in coastal Maine (Anderson, Walter A., *et al.*) 11: 677

mantle—composition
water: Water content of mantle garnets (Aines, Roger D., *et al.*) 12: 720

mantle—processes
degassing: Primordial degassing, lithosphere thicknesss, and the origin of komatiites (Warren, Paul H.) 6: 335

marine geology *see also* continental shelf

marine sediments *see under* sediments

Mars—geomorphology
fluvial features: Shapes of streamlined islands on Earth and Mars; experiments and analyses of the minimum-drag form; discussion and reply (Murty, T. S., *et al.*) 9: 569

Marshall Islands—sedimentary petrology
diagenesis: Petrologic and geochemical constraints on the origin of subsurface dolomite, Enewetak Atoll; an example of dolomitization by normal seawater (Saller, Arthur H.) 4: 217

mass movements *see under* geomorphology

mathematical geology—methods
regression analysis: Improper use of regression equations in earth sciences; discussion and reply (Stransky, Terry, *et al.*) 2: 125

Mediterranean region *see also* the individual countries

Mediterranean region—tectonophysics
plate tectonics: Metamorphic core complexes of Cordilleran type in the Cyclades, Aegean Sea, Greece (Lister, Gordon S., *et al.*) 4: 221

Mediterranean Sea—oceanography
ocean circulation: Contourite drift molded by deep Mediterranean outflow (Faugeres, Jean-Claude, *et al.*) 5: 296

meetings *see* symposia

melange *see under* effects *under* plate tectonics; *see under* interpretation *under* structural analysis; *see under* provenance *under* sedimentation

Mesozoic *see also* Cretaceous; *see also under* geochronology *under* New York

Mesozoic—stratigraphy
paleoclimatology: Temperature and biotic crises in the marine realm (Stanley, Steven M.) 4: 205

metal ores *see also* molybdenum ores; *see also under* economic geology *under* New Mexico

metamorphic rocks *see also* igneous rocks; metamorphism; metasomatism

metamorphic rocks—classification
textures: Fault-related rocks; suggestions for terminology (Wise, Donald U., *et al.*) 7: 391

metamorphic rocks—distribution
complexes: Metamorphic core complexes of Cordilleran type in the Cyclades, Aegean Sea, Greece (Lister, Gordon S., *et al.*) 4: 221

metamorphic rocks—genesis
complexes: Cordilleran metamorphic core complexes; Cenozoic extensional relics of Mesozoic compression (Coney, Peter J., *et al.*) 9: 550

metamorphic rocks—gneisses
classification: Rb-Sr isotope systematics and contrasting histories of late Archean gneisses, West Greenland (Grant, N. K., *et al.*) 10: 599
genesis: Precambrian gneiss and late Proterozoic sedimentation in north-central British Columbia (Evenchick, Carol A., *et al.*) 4: 233

metamorphic rocks—metasedimentary rocks
genesis: Pseudoconglomerate and a re-examination of some paleoenvironmental controversies (Stanistreet, I. G., *et al.*) 12: 717
metabentonite: Model for K-bentonite formation; evidence from zoned K-bentonites in the Disturbed Belt, Montana (Altaner, Stephen P., *et al.*) 7: 412
metasandstone: Was the Alexander Terrane a source of feldspathic sandstones in the Shoo Fly Complex, Sierra Nevada, California? (Girty, Gary H., *et al.*) 6: 339
organic materials: Influence of time on metamorphism of sedimentary organic matter in liquid-dominated geothermal systems, western North America; discussion and reply (Bostick, N. H., *et al.*) 11: 689
tourmalinite: Stratiform tourmalinites in metamorphic terranes and their geologic significance (Slack, John F., *et al.*) 12: 713

metamorphic rocks—metavolcanic rocks
genesis: Continental intra-arc depressions; a nonextensional model for their origin, with a Proterozoic example from Wopmay Orogen (Hildebrand, Robert S., *et al.*) 2: 73

metamorphic rocks—mineral assemblages
graphite: Graphite-CH_4-H_2O-CO_2 equilibria at low-grade metamorphic conditions (Holloway, John R.) 8: 455
zoning: Active metasomatism in the Cerro Prieto geothermal system, Baja California, Mexico; a telescoped low-pressure, low-temperature metamorphic facies series (Schiffman, P., *et al.*) 1: 12

metamorphic rocks—mylonites
elastic properties: Seismic reflectivity of mylonite zones in the crust (Fountain, David M., *et al.*) 4: 195
textures: Borrego Springs-Santa Rosa mylonite zone; a Late Cretaceous west-directed thrust in Southern California (Simpson, Carol) 1: 8

metamorphic rocks—petrology
metamorphic belts: Blueschist and related eclogites (Brown, E. H., *et al.*) 5: 318

metamorphic rocks—schists
blueschist: Californian blueschists, subduction, and the significance of tectonostratigraphic terranes (Ernst, W. G.) 7: 436

metamorphism *see also* metamorphic rocks; metasomatism

metamorphism—burial metamorphism
geologic thermometry: Influence of time on metamorphism of sedimentary organic matter in liquid-dominated geothermal systems, western North America; discussion and reply (Bostick, N. H., *et al.*) 11: 689

metamorphism—environment
subduction zones: Californian blueschists, subduction, and the significance of tectonostratigraphic terranes (Ernst, W. G.) 7: 436

metamorphism—grade
low-grade metamorphism: Graphite-CH_4-H_2O-CO_2 equilibria at low-grade metamorphic conditions (Holloway, John R.) 8: 455

metamorphism—migration of elements
potassium: Model for K-bentonite formation; evidence from zoned K-bentonites in the Disturbed Belt, Montana (Altaner, Stephen P., *et al.*) 7: 412
strontium: Rb-Sr isotope systematics and contrasting histories of late Archean gneisses, West Greenland (Grant, N. K., *et al.*) 10: 599

metamorphism—P-T conditions
indicators: P-T paths from garnet zoning; a new technique for deciphering tectonic processes in crystalline terranes (Spear, Frank S., *et al.*) 2: 87

metamorphism—polymetamorphism
grade: Evolution of the Kid Group, Southeast Sinai Peninsula; thrusts, melanges, and implications for accretionary tectonics during the late Proterozoic of the Arabian-Nubian Shield (Shimron, Aryeh E.) 4: 242

metamorphism—prograde metamorphism
P-T conditions: Active metasomatism in the Cerro Prieto geothermal system, Baja California, Mexico; a telescoped low-pressure, low-temperature metamorphic facies series (Schiffman, P., *et al.*) 1: 12

metamorphism—regional metamorphism
effects: Differential stress magnitudes during regional deformation and metamorphism; upper bound imposed by tensile fracturing; discussion and reply (Tharp, Thomas M., *et al.*) 1: 56

metamorphism—temperature
thermal history: Pogallo Line, South Alps, northern Italy; an intermediate crustal level, low-angle normal fault? (Hodges, K. V., *et al.*) 3: 151

metasomatic rocks *see also* igneous rocks; metamorphic rocks; metamorphism; metasomatism

metasomatism *see also* metamorphism

metasomatism—materials
peridotites: Mantle metasomatism; the REE story (Wilshire, H. G.) 7: 395

metasomatism—processes
hydrothermal alteration: Active metasomatism in the Cerro Prieto geothermal system, Baja California, Mexico; a telescoped low-pressure, low-temperature metamorphic facies series (Schiffman, P., *et al.*) 1: 12
— Casto ring zone; a 4,500-km² fossil hydrothermal system in the Challis volcanic field, central Idaho (Criss, R. E., *et al.*) 6: 331

meteor craters *see also* meteorites; *see also under* geomorphology *under* Arizona

meteor craters—observations
history: Origin of impact craters; ideas and experiments of Hooke, Gilbert, and Wegener (Drake, Ellen T., *et al.*) 7: 408

meteorites *see also* meteor craters

meteorites—genesis
SNC Meteorites: SNC Meteorites; are they Martian rocks? (McSween, Harry Y., Jr.) 1: 3

methods *see under* absolute age; geochronology; mathematical geology; stratigraphy

Mexico *see also* Gulf Coastal Plain

Mexico—petrology
lava: Geodynamic significance of Late Triassic to Early Cretaceous volcanic sequences of Vizcaino Peninsula and Cedros Island, Baja California, Mexico; discussion and reply (Moore, Thomas E., *et al.*) 11: 697
metamorphism: Influence of time on metamorphism of sedimentary organic matter in liquid-dominated geothermal systems, western North America; discussion and reply (Bostick, N. H., *et al.*) 11: 689
metasomatism: Active metasomatism in the Cerro Prieto geothermal system, Baja California, Mexico; a telescoped low-pressure, low-temperature metamorphic facies series (Schiffman, P., *et al.*) 1: 12

Mexico—structural geology
tectonics: History of recurrent activity along a major fault in northeastern Mexico (McKee, James W., *et al.*) 2: 103

Mexico—tectonophysics
plate tectonics: Landward-dipping reflectors in accretionary wedges; active dewatering conduits? (Cloos, Mark) 9: 519

Micronesia *see also* Marshall Islands

mid-ocean ridges *see under* ocean floors

Middle East *see also* Cyprus

Middle East—tectonophysics
plate tectonics: Model for the origin of the Troodos Massif, Cyprus, and other Mideast ophiolites (Moores, E. M., *et al.*) 8: 500

Midwest *see also* Minnesota; Wisconsin

mineral deposits, genesis—lead-zinc deposits
controls: Ore genesis by episodic dewatering of sedimentary basins; application to giant Proterozoic lead-zinc deposits (Sawkins, Frederick J.) 8: 451
ore-forming fluids: Mississippi valley-type lead-zinc deposits (Pratt, Walden P.) 3: 184

mineral deposits, genesis—manganese ores
environment: Origin of manganese giants; sea-level changes and anoxic-oxic history (Frakes, L. A., *et al.*) 2: 83

mineral deposits, genesis—metal ores
absolute age: Rubidium-strontium dating of ore deposits hosted by Rb-rich rocks, using calcite and other common Sr-bearing minerals (Ruiz, Joaquin, *et al.*) 5: 259
structural controls: Basement control of Tertiary intrusions and associated mineral deposits along Tijeras-Canoncito fault system, New Mexico (Woodward, Lee A.) 9: 531

mineral deposits, genesis—molybdenum ores
geochemical controls: Transport and concentration of molybdenum in granite molybdenite systems; effects of fluorine and sulfur (Tingle, Tracy N., *et al.*) 3: 156
— Transport and concentration of molybdenum in granite molybdenite systems; effects of fluorine and sulfur; discussion and reply (Isuk, Edet E., *et al.*) 9: 568

mineral inclusions *see under* inclusions

mineral resources *see also* the individual deposits

minerals *see also* crystal chemistry; crystal growth

minerals—aluminosilicates
phase equilibria: Melting in feldspar-bearing systems to high pressures and the structures of aluminosilicate liquids (Boettcher, Art, *et al.*) 4: 202

minerals—native elements
graphite: Graphite-CH_4-H_2O-CO_2 equilibria at low-grade metamorphic conditions
(Holloway, John R.) 8: 455

minerals—orthosilicates
crystal chemistry: Light-rare-earth-element zoning in sphene and allanite during granitoid fractionation
(Sawka, Wayne N., *et al.*) 3: 131

minerals—orthosilicates, epidote group
crystal growth: Magmatic epidote and its petrologic significance
(Zen, E-an, *et al.*) 9: 515

minerals—orthosilicates, garnet group
phase equilibria: Water content of mantle garnets
(Aines, Roger D., *et al.*) 12: 720
thermodynamic properties: P-T paths from garnet zoning; a new technique for deciphering tectonic processes in crystalline terranes
(Spear, Frank S., *et al.*) 2: 87

minerals—oxides
magnetite: Ultrafine-grained magnetite in deep-sea sediments; possible bacterial magnetofossils
(Kirschvink, Joseph L., *et al.*) 9: 559

Minnesota—structural geology
tectonics: Evidence for nappe development during the early Proterozoic Penokean Orogeny, Minnesota
(Holst, Timothy B.) 3: 135

Miocene *see also under* stratigraphy *under* Arizona

Mississippian *see also* Carboniferous

Mohorovicic discontinuity *see also* crust; mantle; *see also under* seismology *under* Atlantic Ocean

Mollusca—Nautiloidea
Holocene: Sr, Mg, and Ca chemistry of the skeleton of Nautilus
(Crick, Rex E., *et al.*) 2: 99

mollusks—biostratigraphy
Cambrian: Geological implications of Middle Cambrian boulders from the Haymond Formation (Pennsylvanian) in the Marathon Basin, West Texas
(Palmer, Allison R., *et al.*) 2: 91
Cenozoic: Model for the origin of the Yakutat Block, an accreting terrane in the northern Gulf of Alaska; discussions and replies
(Plafker, George, *et al.*) 9: 563

mollusks—ecology
shallow-water environment: Mixing of siliciclastic and carbonate sediments in shallow shelf environments
(Mount, Jeffrey F.) 7: 432

molybdenum—geochemistry
magmas: Transport and concentration of molybdenum in granite molybdenite systems; effects of fluorine and sulfur
(Tingle, Tracy N., *et al.*) 3: 156
— Transport and concentration of molybdenum in granite molybdenite systems; effects of fluorine and sulfur; discussion and reply
(Isuk, Edet E., *et al.*) 9: 568

molybdenum ores—genesis
geochemical controls: Transport and concentration of molybdenum in granite molybdenite systems; effects of fluorine and sulfur
(Tingle, Tracy N., *et al.*) 3: 156
— Transport and concentration of molybdenum in granite molybdenite systems; effects of fluorine and sulfur; discussion and reply
(Isuk, Edet E., *et al.*) 9: 568

Montana—petrology
metamorphism: Model for K-bentonite formation; evidence from zoned K-bentonites in the Disturbed Belt, Montana
(Altaner, Stephen P., *et al.*) 7: 412

Moon—geomorphology
impact features: Origin of impact craters; ideas and experiments of Hooke, Gilbert, and Wegener
(Drake, Ellen T., *et al.*) 7: 408

moraines *see under* glacial features *under* glacial geology

Morocco—geomorphology
weathering: Rock temperatures from Southeast Morocco and their significance for experimental rock-weathering studies
(Kerr, Anne, *et al.*) 5: 306

Morocco—stratigraphy
Triassic: Role of synsedimentary strike-slip faults in the formation of Moroccan Triassic basins
(Laville, Edgard, *et al.*) 7: 424

Morocco—structural geology
tectonics: Role of synsedimentary strike-slip faults in the formation of Moroccan Triassic basins
(Laville, Edgard, *et al.*) 7: 424

mud volcanoes *see also* volcanology

nannofossils *see under* algal flora

nappes *see under* orientation *under* folds

native elements *see under* minerals

neodymium—isotopes
Nd-144/Nd-143: Origin and age of Adirondack anorthosites re-evaluated with Nd isotopes; discussion and reply
(Parrish, Randall R., *et al.*) 6: 380
— Sm-Nd direct dating of the Collins Bay hydrothermal uranium deposit, Saskatchewan
(Fryer, B. J., *et al.*) 8: 479

Neogene *see also under* stratigraphy *under* Antarctica

Neogene—stratigraphy
paleoclimatology: Neogene marine climate trends; implications for biogeography and evolution of the shallow-sea biota
(Valentine, James W.) 11: 647

neotectonics *see also* tectonics; *see also under* structural geology *under* Arizona; Atlantic Coastal Plain; Basin and Range Province; California; Colorado Plateau; Great Basin; Japan; Nevada; New England; Papua New Guinea; Utah

Nevada—geochronology
Holocene: Recurrent Holocene strike-slip faulting, Pyramid Lake fault zone, western Nevada
(Anderson, Larry W., *et al.*) 11: 681

Nevada—sedimentary petrology
reefs: Were there framework reefs in the Cambrian?
(Rowland, Stephen M.) 3: 181

Nevada—structural geology
neotectonics: Recurrent Holocene strike-slip faulting, Pyramid Lake fault zone, western Nevada
(Anderson, Larry W., *et al.*) 11: 681
tectonics: Evidence for Late Devonian movement within the Roberts Mountains Allochthon, Roberts Mountains, Nevada
(Murphy, M. A., *et al.*) 1: 20
— Evidence for Late Devonian movement within the Roberts Mountains Allochthon, Roberts Mountains, Nevada; discussion and reply
(Ketner, Keith, *et al.*) 7: 445
— Recent studies indicate that major structures in northeastern Nevada and the Golconda Thrust in north-central Nevada are of Jurassic or Cretaceous age
(Ketner, Keith B.) 8: 483

New Brunswick—stratigraphy
Triassic: Tectonic control of Triassic sedimentation in southern New Brunswick; local and regional implications
(Nadon, G. C., *et al.*) 10: 619

New Brunswick—structural geology
tectonics: Tectonic control of Triassic sedimentation in southern New Brunswick; local and regional implications
(Nadon, G. C., *et al.*) 10: 619

New England—structural geology
neotectonics: Crustal warping in coastal Maine
(Anderson, Walter A., *et al.*) 11: 677

New England—tectonophysics
crust: Crustal warping in coastal Maine
(Anderson, Walter A., *et al.*) 11: 677

New Jersey—oceanography
continental slope: Spring sapping on the lower continental slope, offshore New Jersey
(Robb, James M.) 5: 278

New Mexico—economic geology
metal ores: Basement control of Tertiary intrusions and associated mineral deposits along Tijeras-Canoncito fault system, New Mexico
(Woodward, Lee A.) 9: 531

New Mexico—sedimentary petrology
reefs: Salina-margin tepees, pisoliths, and aragonite cements, Lake MacLeod, Western Australia; their significance in interpreting ancient analogs
(Handford, C. Robertson, *et al.*) 9: 523

New Mexico—structural geology
tectonics: Basement control of Tertiary intrusions and associated mineral deposits along Tijeras-Canoncito fault system, New Mexico
(Woodward, Lee A.) 9: 531

New York—geochronology
Mesozoic: Uplift rate of Adirondack anorthosite measured by fission-track analysis of apatite; discussion and reply
(Morgan, Paul, *et al.*) 2: 124
Proterozoic: Origin and age of Adirondack anorthosites re-evaluated with Nd isotopes; discussion and reply
(Parrish, Randall R., *et al.*) 6: 380

New York—stratigraphy
Devonian: Episodic accumulation and the origin of formation boundaries in the Helderberg Group of New York State
(Anderson, E. J., *et al.*) 2: 120
— Episodic accumulation and the origin of formation boundaries in the Helderberg Group of New York State; discussion and reply
(Wilkinson, Bruce H., *et al.*) 9: 572
— Episodic accumulation and the origin of formation boundaries in the Helderberg Group of New York State; discussion and reply
(Kradyna, James, *et al.*) 10: 637

New Zealand—volcanology
North Island: Dispersed rhyolitic tephra from New Zealand in deep-sea sediments of the Southern Ocean
(Kyle, Philip R., *et al.*) 8: 487

Newfoundland—tectonophysics
crust: Reinterpretation of Newfoundland gravity data and arguments for an allochthonous Dunnage Zone; discussion and reply
(Miller, H. G., *et al.*) 1: 60

nomenclature *see under* structural geology

North America *see also* Appalachians; Atlantic Coastal Plain; Canada; Gulf Coastal Plain; Mexico; United States

North America—geochronology
Ordovician: The Decade of North American Geology 1983 geologic time scale; discussion and reply
(Ross, Reuben J., Jr., *et al.*) 8: 505
Phanerozoic: The Decade of North American Geology 1983 geologic time scale; discussion and reply
(Wilson, Edward Norman, *et al.*) 4: 253
Precambrian: The Decade of North American Geology 1983 geologic time scale; discussion and reply
(Wilson, Edward Norman, *et al.*) 4: 253

North America—paleontology
ichnofossils: Abundant and diverse early Paleozoic infauna indicated by the stratigraphic record
(Miller, Molly Fritz, *et al.*) 1: 40

North America—petrology
metamorphism: Influence of time on metamorphism of sedimentary organic matter in liquid-dominated geothermal systems, western North America; discussion and reply
(Bostick, N. H., *et al.*) 11: 689

North America—stratigraphy
Proterozoic: Subsidence analysis of the Cordilleran miogeocline; implications for timing of late Proterozoic rifting and amount of extension; discussion and reply
(Link, Paul Karl, *et al.*) 11: 699

North America—structural geology
tectonics: Cordilleran metamorphic core complexes; Cenozoic extensional relics of Mesozoic compression
(Coney, Peter J., *et al.*) 9: 550

North America—tectonophysics
crust: Cordilleran metamorphic core complexes; Cenozoic extensional relics of Mesozoic compression
(Coney, Peter J., *et al.*) 9: 550
isostasy: Concentrically zoned pattern in the Bouguer gravity anomaly map of northeastern North America; discussion and reply
(Thomas, M. D., *et al.*) 1: 57
plate tectonics: Tectonic control of Triassic sedimentation in southern New Brunswick; local and regional implications
(Nadon, G. C., *et al.*) 10: 619
— Truncation of the Appalachian Piedmont beneath the coastal plain of Alabama; evidence from new magnetic data
(Horton, J. Wright, Jr., *et al.*) 1: 51

North Carolina—geochemistry
weathering: Natural weathering mechanisms of almandine garnet
(Velbel, Michael Anthony) 10: 631

North Carolina—petrology
intrusions: Juxtaposed Mesozoic diabase dike sets from the Carolinas; a preliminary assessment; discussion and reply
(Butler, J. Robert, *et al.*) 8: 504

North Carolina—stratigraphy
Proterozoic: Ediacarian fossils from the Carolina slate belt, Stanly County, North Carolina
(Gibson, Gail G., *et al.*) 7: 387

Northern Hemisphere *see also* Arctic Ocean; Atlantic Ocean; Central America; Europe; North America; Pacific Ocean; USSR

Northern Territory—economic geology
manganese ores: Origin of manganese giants; sea-level changes and anoxic-oxic history
(Frakes, L. A., *et al.*) 2: 83

Northwest Territories—geochronology
Pleistocene: Glacial and nonglacial sediments of Matuyama paleomagnetic age on Banks Island, Canadian Arctic Archipelago
(Vincent, Jean-Serge, *et al.*) 3: 139
Proterozoic: Short-lived 1.9 Ga continental margin and its destruction, Wopmay Orogen, Northwest Canada
(Hoffman, Paul F., *et al.*) 2: 68

Northwest Territories—tectonophysics
crust: Continental intra-arc depressions; a nonextensional model for their origin, with a Proterozoic example from Wopmay Orogen
(Hildebrand, Robert S., *et al.*) 2: 73

Nova Scotia—oceanography
continental shelf: Holocene rise of relative sea level at Sable Island, Nova Scotia, Canada
(Scott, D. B., *et al.*) 3: 173

Nova Scotia—stratigraphy
changes of level: Holocene rise of relative sea level at Sable Island, Nova Scotia, Canada
(Scott, D. B., *et al.*) 3: 173
Holocene: Holocene rise of relative sea level at Sable Island, Nova Scotia, Canada
(Scott, D. B., *et al.*) 3: 173

ocean circulation *see also under* oceanography *under* Atlantic Ocean; Mediterranean Sea; Portugal

ocean floors *see also under* oceanography *under* Atlantic Ocean; Bahamas; Pacific Ocean

ocean floors—mid-ocean ridges
igneous activity: Anorthosite genesis; the mid-ocean ridge analogue
(Flower, Martin F. J.) 11: 651
sea-floor spreading: Evolution of ridges by asymmetrical spreading
(Menard, H. W.) 3: 177

Oligocene *see also under* stratigraphy *under* Atlantic Ocean; Pacific Ocean

Ontario—stratigraphy
Pleistocene: Sedimentation in a large lake; a reinterpretation of the late Pleistocene stratigraphy at Scarborough Bluffs, Ontario, Canada; discussions and reply
(Karrow, P. F., *et al.*) 3: 185
ophiolite *see under* ultramafics *under* igneous rocks
Ordovician *see also under* geochronology *under* North America; United States; *see also under* stratigraphy *under* Antarctica
Ordovician—stratigraphy
paleoclimatology: Temperature and biotic crises in the marine realm
(Stanley, Steven M.) 4: 205
paleoecology: Abundant and diverse early Paleozoic infauna indicated by the stratigraphic record
(Miller, Molly Fritz, *et al.*) 1: 40
Oregon—geochronology
Quaternary: Mono Lake geomagnetic excursion found at Summer Lake, Oregon
(Negrini, Robert M., *et al.*) 11: 643
Oregon—stratigraphy
Tertiary: John Day Formation of Oregon; a distal record of early Cascade volcanism
(Robinson, Paul T., *et al.*) 4: 229
Oregon—tectonophysics
plate tectonics: Has the Washington-Oregon Coast Range moved northward?
(Beck, Myrl E., Jr.) 12: 737
organic materials—alteration
diagenesis: Problem of secondary porosity; Frio Formation (Oligocene), Texas Gulf Coast
(Lundegard, Paul D., *et al.*) 7: 399
thermal alteration: Influence of time on metamorphism of sedimentary organic matter in liquid-dominated geothermal systems, western North America; discussion and reply
(Bostick, N. H., *et al.*) 11: 689
organic materials—geochemistry
sedimentary rocks: C/S method for distinguishing freshwater from marine sedimentary rocks
(Berner, Robert A., *et al.*) 6: 365
orogeny *see also* epeirogeny; tectonics
orogeny—absolute age
Antler Orogeny: Timing of pre-Antler deformation in the Shoo Fly Complex, Sierra Nevada, California
(Girty, Gary H., *et al.*) 11: 673
orogeny—evolution
Allegheny Orogeny: Truncation of the Appalachian Piedmont beneath the coastal plain of Alabama; evidence from new magnetic data
(Horton, J. Wright, Jr., *et al.*) 1: 51
Antler Orogeny: Evidence for Late Devonian movement within the Roberts Mountains Allochthon, Roberts Mountains, Nevada
(Murphy, M. A., *et al.*) 1: 20
Laramide Orogeny: Stress orientations during Oligocene volcanism in Trans-Pecos Texas; timing the transition from Laramide compression to Basin and Range tension
(Price, Jonathan G., *et al.*) 4: 238
Sonoma Orogeny: Recent studies indicate that major structures in northeastern Nevada and the Golconda Thrust in north-central Nevada are of Jurassic or Cretaceous age
(Ketner, Keith B.) 8: 483
Wopmay Orogeny: Continental intra-arc depressions; a nonextensional model for their origin, with a Proterozoic example from Wopmay Orogen
(Hildebrand, Robert S., *et al.*) 2: 73
— Short-lived 1.9 Ga continental margin and its destruction, Wopmay Orogen, Northwest Canada
(Hoffman, Paul F., *et al.*) 2: 68
orogeny—mechanism
Alice Springs Orogeny: Terminal fold-belt deformation; relationship of Mid-Carboniferous megakinks in the Tasman fold belt to coeval thrusts in cratonic Australia
(Powell, Christopher M.) 9: 546
Cordilleran Orogeny: Cordilleran metamorphic core complexes; Cenozoic extensional relics of Mesozoic compression
(Coney, Peter J., *et al.*) 9: 550
Nevadan Orogeny: Overthrust model for the Sierra Nevada
(Moores, E. M., *et al.*) 7: 416
Penokean Orogeny: Evidence for nappe development during the early Proterozoic Penokean Orogeny, Minnesota
(Holst, Timothy B.) 3: 135
plate collision: Paleozoic evolution of the Armorica Plate on the basis of paleomagnetic data
(Perroud, Herve, *et al.*) 10: 579
orthosilicates *see under* minerals
oxides *see under* minerals
oxygen—isotopes
O-18/O-16: Casto ring zone; a 4,500-km² fossil hydrothermal system in the Challis volcanic field, central Idaho
(Criss, R. E., *et al.*) 6: 331
— Middle Oligocene cooling from Equatorial Pacific DSDP Site 77B
(Keigwin, Lloyd, *et al.*) 1: 16
— Salina-margin tepees, pisoliths, and aragonite cements, Lake MacLeod, Western Australia; their significance in interpreting ancient analogs
(Handford, C. Robertson, *et al.*) 9: 523
P-T conditions *see under* metamorphism; *see under* prograde metamorphism *under* metamorphism
Pacific Coast *see also* the individual states and provinces
Pacific Coast—petrology
magmas: Magmatic epidote and its petrologic significance
(Zen, E-an, *et al.*) 9: 515
Pacific Coast—tectonophysics
plate tectonics: Has the Washington-Oregon Coast Range moved northward?
(Beck, Myrl E., Jr.) 12: 737
Pacific Ocean *see also* Coral Sea; Japan Sea
Pacific Ocean—geophysical surveys
acoustical surveys: Morphology of Bonin fore-arc submarine canyons
(Taylor, Brian, *et al.*) 12: 724
Pacific Ocean—oceanography
ocean floors: Hawaiian hotspot volcanism mainly during geomagnetic normal intervals
(Moberly, Ralph, *et al.*) 8: 459
Pacific Ocean—paleontology
Mollusca: Sr, Mg, and Ca chemistry of the skeleton of Nautilus
(Crick, Rex E., *et al.*) 2: 99
Pacific Ocean—stratigraphy
Oligocene: Middle Oligocene cooling from Equatorial Pacific DSDP Site 77B
(Keigwin, Lloyd, *et al.*) 1: 16
Pacific Ocean—tectonophysics
plate tectonics: Model for the origin of the Yakutat Block, an accreting terrane in the northern Gulf of Alaska; discussions and replies
(Plafker, George, *et al.*) 9: 563
Pacific region *see also* the individual countries
Pacific region—tectonophysics
plate tectonics: Late Permian-Early Triassic paleogeography of northern Japan; did Pacific microplates accrete to Japan?
(Choi, Dong Ryong) 12: 728
Paleocene—stratigraphy
boundary: Spheroids at the Cretaceous-Tertiary boundary are altered impact droplets of basaltic composition; discussion and reply
(Bohor, Bruce, *et al.*) 11: 695
paleoclimatology—Cenozoic
Alaska: Model for the origin of the Yakutat Block, an accreting terrane in the northern Gulf of Alaska; discussions and replies
(Plafker, George, *et al.*) 9: 563
Antarctica: Cenozoic marine sedimentation and ice-volume variation on the East Antarctic Craton
(Webb, P. N., *et al.*) 5: 287
Arctic Ocean: Baffin Bay; present-day analog of the central Arctic during late Pliocene to mid-Pleistocene time; discussion and reply
(Kellogg, Thomas B., *et al.*) 6: 378

paleoclimatology—Cretaceous
global: Cretaceous climates
(Barron, Eric J., *et al.*) 6: 377

paleoclimatology—Neogene
Antarctica: Late Tertiary history of the Antarctic ice sheet; evidence form the dry valleys
(Denton, George H., *et al.*) 5: 263
global: Neogene marine climate trends; implications for biogeography and evolution of the shallow-sea biota
(Valentine, James W.) 11: 647

paleoclimatology—Oligocene
Pacific Ocean: Middle Oligocene cooling from Equatorial Pacific DSDP Site 77B
(Keigwin, Lloyd, *et al.*) 1: 16

paleoclimatology—Paleogene
Atlantic Ocean: Eocene-Oligocene boundary; biostratigraphic recognition and gradual paleoceanographic change at DSDP Site 549
(Snyder, Scott W., *et al.*) 2: 112

paleoclimatology—paleotemperature
changes: Climatic implications of the variable obliquity explanation of Cretaceous-Paleogene high-latitude floras
(Barron, Eric J.) 10: 595
— Temperature and biotic crises in the marine realm
(Stanley, Steven M.) 4: 205
— Temperature and biotic crises in the marine realm; discussion and reply
(Johnson, J. G., *et al.*) 12: 741

paleoclimatology—Quaternary
Mediterranean region: Contourite drift molded by deep Mediterranean outflow
(Faugeres, Jean-Claude, *et al.*) 5: 296

paleoecology—Cenozoic
Antarctica: Cenozoic marine sedimentation and ice-volume variation on the East Antarctic Craton
(Webb, P. N., *et al.*) 5: 287

paleoecology—changes
extinction: Temperature and biotic crises in the marine realm
(Stanley, Steven M.) 4: 205
— Temperature and biotic crises in the marine realm; discussion and reply
(Johnson, J. G., *et al.*) 12: 741

paleoecology—Cretaceous
deep-sea environment: Low productivity and slow deep-water circulation in Mid-Cretaceous oceans
(Bralower, Timothy J., *et al.*) 10: 614

paleoecology—foraminifers
Oligocene: Middle Oligocene cooling from Equatorial Pacific DSDP Site 77B
(Keigwin, Lloyd, *et al.*) 1: 16

paleoecology—interpretation
marine environment: Neogene marine climate trends; implications for biogeography and evolution of the shallow-sea biota
(Valentine, James W.) 11: 647

paleoecology—invertebrates
Paleozoic: Abundant and diverse early Paleozoic infauna indicated by the stratigraphic record
(Miller, Molly Fritz, *et al.*) 1: 40

paleoecology—Paleogene
Atlantic Ocean: Eocene-Oligocene boundary; biostratigraphic recognition and gradual paleoceanographic change at DSDP Site 549
(Snyder, Scott W., *et al.*) 2: 112

paleoecology—Plantae
Cretaceous: Climatic implications of the variable obliquity explanation of Cretaceous-Paleogene high-latitude floras
(Barron, Eric J.) 10: 595

paleoecology—sedimentation
shelf environment: Mixing of siliciclastic and carbonate sediments in shallow shelf environments
(Mount, Jeffrey F.) 7: 432

Paleogene *see also under* stratigraphy *under* Arctic Ocean; Atlantic Coastal Plain; Gulf of Mexico

Paleogene—stratigraphy
paleoclimatology: Climatic implications of the variable obliquity explanation of Cretaceous-Paleogene high-latitude floras
(Barron, Eric J.) 10: 595

paleogeography—Cambrian
Texas: Geological implications of Middle Cambrian boulders from the Haymond Formation (Pennsylvanian) in the Marathon Basin, West Texas
(Palmer, Allison R., *et al.*) 2: 91

paleogeography—Cenozoic
Caribbean region: Cenozoic rift formation in the northern Caribbean
(Mann, Paul, *et al.*) 12: 732
Europe: Sedimentary basins formed and carried piggyback on active thrust sheets
(Ori, G. G., *et al.*) 8: 475

paleogeography—Cretaceous
Bahamas: Early Cretaceous platform re-entrant and escarpment erosion in the Bahamas
(Schlager, Wolfgang, *et al.*) 3: 147
Washington: Evidence for a margin-truncating transcurrent fault (pre-late Eocene) in western Washington
(Johnson, Samuel Y.) 9: 538

paleogeography—Eocene
Wyoming: Yellowstone fossil forests; new evidence for burial in place
(Yuretich, Richard F.) 3: 159

paleogeography—Ordovician
Atlantic region: British paleomagnetism, Iapetus Ocean, and the Great Glen Fault
(Briden, J. C., *et al.*) 7: 428

paleogeography—Paleogene
Atlantic Coastal Plain: Suwannee channel of the Paleogene coastal plain; support for the "carbonate suppression" model of basin formation
(McKinney, Michael L.) 6: 343

paleogeography—Paleozoic
Atlantic region: Paleozoic evolution of the Armorica Plate on the basis of paleomagnetic data
(Perroud, Herve, *et al.*) 10: 579
Canada: Evidence against large-scale strike-slip separation of Paleozoic strata along the Richardson-Hess fault system, northern Canadian Cordillera
(Cecile, M. P.) 7: 403

paleogeography—Permian
Japan: Late Permian-Early Triassic paleogeography of northern Japan; did Pacific microplates accrete to Japan?
(Choi, Dong Ryong) 12: 728

paleogeography—Proterozoic
Egypt: Evolution of the Kid Group, Southeast Sinai Peninsula; thrusts, melanges, and implications for accretionary tectonics during the late Proterozoic of the Arabian-Nubian Shield
(Shimron, Aryeh E.) 4: 242
North Carolina: Ediacarian fossils from the Carolina slate belt, Stanly County, North Carolina
(Gibson, Gail G., *et al.*) 7: 387

paleogeography—Triassic
Morocco: Role of synsedimentary strike-slip faults in the formation of Moroccan Triassic basins
(Laville, Edgard, *et al.*) 7: 424

paleomagnetism *see under* geochronology

paleomagnetism—Cenozoic
California: K-Ar dating of the Cima volcanic field, eastern Mojave Desert, California; late Cenozoic volcanic history and landscape evolution
(Dohrenwend, John C., *et al.*) 3: 163
Hawaii: Hawaiian hotspot volcanism mainly during geomagnetic normal intervals
(Moberly, Ralph, *et al.*) 8: 459

paleomagnetism—Devonian
Scotland: Evidence for early Tertiary remagnetization of Devonian rocks from the Orcadian Basin, northern Scotland, and associated transcurrent fault motion
(Cisowski, Stanley M.) 6: 369

paleomagnetism—Mesozoic
Italy: Magnetostratigraphy of the Jurassic-Cretaceous boundary in the Maiolica Limestone (Umbria, Italy)
(Lowrie, W., *et al.*) 1: 44
— Magnetostratigraphy of the Jurassic-Cretaceous boundary in the Maiolica Limestone (Umbria, Italy); discussion and reply
(Ogg, James G., *et al.*) 11: 701

paleomagnetism—Miocene
Arizona: Paleomagnetism of Miocene volcanic rocks from southwestern Arizona; tectonic implications
(Calderone, Gary, *et al.*) 10: 627

paleomagnetism—Paleozoic
Atlantic region: Palcozoic evolution of the Armorica Plate on the basis of paleomagnetic data
(Perroud, Herve, *et al.*) 10: 579
Great Britain: British paleomagnetism, Iapetus Ocean, and the Great Glen Fault
(Briden, J. C., *et al.*) 7: 428

paleomagnetism—Pleistocene
Northwest Territories: Glacial and nonglacial sediments of Matuyama paleomagnetic age on Banks Island, Canadian Arctic Archipelago
(Vincent, Jean-Serge, *et al.*) 3: 139

paleomagnetism—Quaternary
Oregon: Mono Lake geomagnetic excursion found at Summer Lake, Oregon
(Negrini, Robert M., *et al.*) 11: 643

paleomagnetism—stability
marine sediments: Ultrafine-grained magnetite in deep-sea sediments; possible bacterial magnetofossils
(Kirschvink, Joseph L., *et al.*) 9: 559

paleomagnetism—Tertiary
Washington: Has the Washington-Oregon Coast Range moved northward?
(Beck, Myrl E., Jr.) 12: 737

Paleozoic *see also* Cambrian; Carboniferous; Devonian; Ordovician; *see also under* geochronology *under* California; *see also under* stratigraphy *under* Atlantic region; Canada; Great Britain; Scotland; Yukon Territory

Paleozoic—stratigraphy
paleoecology: Abundant and diverse early Paleozoic infauna indicated by the stratigraphic record
(Miller, Molly Fritz, *et al.*) 1: 40
— Abundant and diverse early Paleozoic infauna indicated by the stratigraphic record; discussion and reply
(Pickerill, Ronald K., *et al.*) 9: 567

paleozoogeography *see* biogeography

Papua New Guinea—structural geology
neotectonics: Relative rates of tectonic uplift as determined from episodic turbidite deposition in marine basins
(Klein, George de Vries) 1: 48

paragenesis—metamorphic rocks
Mexico: Active metasomatism in the Cerro Prieto geothermal system, Baja California, Mexico; a telescoped low-pressure, low-temperature metamorphic facies series
(Schiffman, P., *et al.*) 1: 12

Pennsylvanian *see also* Carboniferous; *see also under* stratigraphy *under* Appalachians

peridotites *see under* igneous rocks

Permian *see also under* stratigraphy *under* Japan

Peru—geochemistry
trace elements: Rare-element-enriched, S-type ash-flow tuffs containing phenocrysts of muscovite, andalusite, and sillimanite, southeastern Peru
(Noble, Donald C., *et al.*) 1: 35

Phanerozoic *see also* Cambrian; Carboniferous; Cenozoic; Cretaceous; Devonian; Eocene; Holocene; Mesozoic; Neogene; Ordovician; Paleocene; Paleogene; Paleozoic; Tertiary; *see also under* geochronology *under* North America

Phanerozoic—geochronology
time scales: Toward an objective Phanerozoic time scale
(Carr, Paul F., *et al.*) 5: 274

Phanerozoic—sedimentary petrology
sedimentation: Mixing of siliciclastic and carbonate sediments in shallow shelf environments
(Mount, Jeffrey F.) 7: 432

Phanerozoic—stratigraphy
paleoclimatology: Temperature and biotic crises in the marine realm
(Stanley, Steven M.) 4: 205

phase equilibria—magmas
experimental studies: A magmatic geohygrometer; application to Mount St. Helens and other dacitic magmas
(Merzbacher, Celia, *et al.*) 10: 587
— Magmatic epidote and its petrologic significance
(Zen, E-an, *et al.*) 9: 515
— Transport and concentration of molybdenum in granite molybdenite systems; effects of fluorine and sulfur
(Tingle, Tracy N., *et al.*) 3: 156

phase equilibria—melting
experimental studies: Melting in feldspar-bearing systems to high pressures and the structures of aluminosilicate liquids
(Boettcher, Art, *et al.*) 4: 202

phase equilibria—orthosilicates, garnet group
experimental studies: Water content of mantle garnets
(Aines, Roger D., *et al.*) 12: 720

phase equilibria—theoretical studies
C-O-H: Graphite-CH_4-H_2O-CO_2 equilibria at low-grade metamorphic conditions
(Holloway, John R.) 8: 455
CO_2-H_2O-NaCl: Adiabatic decompression of aqueous solutions; applications to hydrothermal fluid migration in the crust
(Wood, Scott A., *et al.*) 12: 707

physical geography *see* geomorphology

planetology *see also* Mars; Moon

planetology—cosmic dust
genesis: Volcanic and stratospheric dustlike particles produced by experimental water-melt interactions
(Wohletz, Kenneth H., *et al.*) 10: 591

Plantae *see also* algal flora; ichnofossils; problematic fossils; Protista

plate tectonics *see also under* tectonophysics *under* Alaska; Appalachians; Atlantic Ocean; Atlantic region; California; Canadian Shield; Caribbean region; Central America; Cyprus; Europe; France; Indonesia; Japan; Mediterranean region; Mexico; Middle East; North America; Oregon; Pacific Coast; Pacific Ocean; Pacific region; Red Sea region; symposia; Washington

plate tectonics—age
Proterozoic: Subsidence analysis of the Cordilleran miogeocline; implications for timing of late Proterozoic rifting and amount of extension; discussion and reply
(Link, Paul Karl, *et al.*) 11: 699

plate tectonics—effects
melange: Landward-dipping reflectors in accretionary wedges; active dewatering conduits?
(Cloos, Mark) 9: 519

Pleistocene *see also under* geochronology *under* Northwest Territories; *see also under* stratigraphy *under* Ontario; United Kingdom

Pliocene *see also under* stratigraphy *under* Antarctica

plutons *see under* intrusions

Portugal—oceanography
ocean circulation: Contourite drift molded by deep Mediterranean outflow
(Faugeres, Jean-Claude, *et al.*) 5: 296

potassium—geochemistry
bentonite: Model for K-bentonite formation; evidence from zoned K-bentonites in the Disturbed Belt, Montana
(Altaner, Stephen P., *et al.*) 7: 412
Precambrian *see also* Archean; Proterozoic; *see also under* geochronology *under* North America
problematic fossils—biogeography
Proterozoic: Ediacarian fossils from the Carolina slate belt, Stanly County, North Carolina
(Gibson, Gail G., *et al.*) 7: 387
Proterozoic *see also under* geochronology *under* British Columbia; New York; Northwest Territories; Saskatchewan; Saudi Arabia; *see also under* stratigraphy *under* British Columbia; Egypt; North America; North Carolina; Western U.S.
Proterozoic—petrology
magmas: Anorthosite genesis; the mid-ocean ridge analogue
(Flower, Martin F. J.) 11: 651
Protista—biostratigraphy
Jurassic: Magnetostratigraphy of the Jurassic-Cretaceous boundary in the Maiolica Limestone (Umbria, Italy)
(Lowrie, W., *et al.*) 1: 44
— Magnetostratigraphy of the Jurassic-Cretaceous boundary in the Maiolica Limestone (Umbria, Italy); discussion and reply
(Ogg, James G., *et al.*) 11: 701
Protista—Silicoflagellata
Eocene: Paleogene paleoceanography of the Arctic Ocean is constrained by the middle or late Eocene age of USGS core Fl-422; evidence from silicoflagellates
(Bukry, David) 4: 199
Protozoa *see* Protista
Pyrenees *see also* France; Spain
Pyrenees—structural geology
tectonics: Sedimentary basins formed and carried piggyback on active thrust sheets
(Ori, G. G., *et al.*) 8: 475
pyroclastics *see under* igneous rocks
Quaternary *see also* Holocene; *see also under* geochronology *under* Oregon; *see also under* stratigraphy *under* Arctic Ocean
Quebec—geochronology
Cretaceous: Geochronology of the Monteregian Hills alkaline igneous province, Quebec
(Eby, G. Nelson) 8: 468
Quebec—geomorphology
fluvial features: Shapes of streamlined islands on Earth and Mars; experiments and analyses of the minimum-drag form; discussion and reply
(Murty, T. S., *et al.*) 9: 569
radioactive dating *see* absolute age
radiocarbon dating *see* absolute age
rare earths *see also* neodymium
rare earths—geochemistry
ash-flow tuff: Rare-element-enriched, S-type ash-flow tuffs containing phenocrysts of muscovite, andalusite, and sillimanite, southeastern Peru
(Noble, Donald C., *et al.*) 1: 35
peridotites: Mantle metasomatism; the REE story
(Wilshire, H. G.) 7: 395
titanite: Light-rare-earth-element zoning in sphene and allanite during granitoid fractionation
(Sawka, Wayne N., *et al.*) 3: 131
uranium ores: Sm-Nd direct dating of the Collins Bay hydrothermal uranium deposit, Saskatchewan
(Fryer, B. J., *et al.*) 8: 479
Red Sea region—tectonophysics
plate tectonics: Evolution of the Kid Group, Southeast Sinai Peninsula; thrusts, melanges, and implications for accretionary tectonics during the late Proterozoic of the Arabian-Nubian Shield
(Shimron, Aryeh E.) 4: 242
— Late Precambrian rifting and crustal evolution in the Northeast Desert of Egypt
(Stern, Robert J., *et al.*) 3: 168
reefs *see also under* sedimentary petrology *under* Nevada; New Mexico; Texas
regional geology *see* areal geology under the appropriate area term
remote sensing *see also* geophysical methods; *see also under* geophysical surveys *under* California
rhyolites *see under* igneous rocks
rift zones *see under* systems *under* faults
rock mechanics—materials, properties
thermal properties: Rock temperatures from Southeast Morocco and their significance for experimental rock-weathering studies
(Kerr, Anne, *et al.*) 5: 306
Rocky Mountains *see also* the individual states and provinces
Russia *see* USSR
Sahara *see also* the individual countries
sandstone *see also under* clastic rocks *under* sedimentary rocks
Saskatchewan—economic geology
uranium ores: Sm-Nd direct dating of the Collins Bay hydrothermal uranium deposit, Saskatchewan
(Fryer, B. J., *et al.*) 8: 479
Saskatchewan—geochronology
Proterozoic: Sm-Nd direct dating of the Collins Bay hydrothermal uranium deposit, Saskatchewan
(Fryer, B. J., *et al.*) 8: 479
Saskatchewan—geomorphology
fluvial features: William River; an outstanding example of channel widening and braiding caused by bed-load addition
(Smith, Norman D., *et al.*) 2: 78
Saudi Arabia—geochronology
Proterozoic: Geochronologic and isotopic evidence for early Proterozoic crust in the eastern Arabian Shield
(Stacey, John S., *et al.*) 5: 310
Saudi Arabia—structural geology
tectonics: Early poststabilization sedimentation and later growth of shields
(Rogers, John J. W., *et al.*) 10: 607
Scotland—stratigraphy
Devonian: Evidence for early Tertiary remagnetization of Devonian rocks from the Orcadian Basin, northern Scotland, and associated transcurrent fault motion
(Cisowski, Stanley M.) 6: 369
Paleozoic: British paleomagnetism, Iapetus Ocean, and the Great Glen Fault
(Briden, J. C., *et al.*) 7: 428
sea-floor spreading *see also* plate tectonics; *see also under* tectonophysics *under* Atlantic Ocean; Indian Ocean
sea-floor spreading—evolution
patterns: Evolution of ridges by asymmetrical spreading
(Menard, H. W.) 3: 177
Sea of Japan *see* Japan Sea
sedimentary rocks *see also* sedimentary structures; sedimentation; sediments
sedimentary rocks—carbonate rocks
dolostone: Dolomite selectivity and mimic replacement
(Bullen, Susan B., *et al.*) 11: 655
— Petrologic and geochemical constraints on the origin of subsurface dolomite, Enewetak Atoll; an example of dolomitization by normal seawater
(Saller, Arthur H.) 4: 217
environmental analysis: Early Cretaceous platform re-entrant and escarpment erosion in the Bahamas
(Schlager, Wolfgang, *et al.*) 3: 147
— Were there framework reefs in the Cambrian?
(Rowland, Stephen M.) 3: 181
micrite: Solution cleavage and its relationship to major structures in the Idaho-Utah-Wyoming thrust belt
(Mitra, Gautam, *et al.*) 6: 354
— Transformation of aragonite-dominated lime muds to microcrystalline limestones
(Lasemi, Zakaria, *et al.*) 7: 420

sedimentary rocks—clastic rocks
diamictite: Subsidence analysis of the Cordilleran miogeocline; implications for timing of late Proterozoic rifting and amount of extension; discussion and reply
(Link, Paul Karl, *et al.*) 11: 699
provenance: Geological implications of Middle Cambrian boulders from the Haymond Formation (Pennsylvanian) in the Marathon Basin, West Texas
(Palmer, Allison R., *et al.*) 2: 91
sandstone: Problem of secondary porosity; Frio Formation (Oligocene), Texas Gulf Coast
(Lundegard, Paul D., *et al.*) 7: 399

sedimentary rocks—environmental analysis
fluvial environment: Tectonic control of Triassic sedimentation in southern New Brunswick; local and regional implications
(Nadon, G. C., *et al.*) 10: 619

sedimentary rocks—geochemistry
carbon: C/S method for distinguishing freshwater from marine sedimentary rocks
(Berner, Robert A., *et al.*) 6: 365
isotopes: Ocean stagnation and ventilation defined by $\delta^{34}S$ secular trends in pyrite and barite, Selwyn Basin, Yukon
(Goodfellow, Wayne D., *et al.*) 10: 583

sedimentary rocks—lithofacies
environmental analysis: Mixing of siliciclastic and carbonate sediments in shallow shelf environments
(Mount, Jeffrey F.) 7: 432
— Suwannee channel of the Paleogene coastal plain; support for the "carbonate suppression" model of basin formation
(McKinney, Michael L.) 6: 343

sedimentary rocks—lithostratigraphy
Carboniferous: Correlation of Carboniferous strata using a hierarchy of transgressive-regressive units
(Busch, Richard M., *et al.*) 8: 471
Devonian: Episodic accumulation and the origin of formation boundaries in the Helderberg Group of New York State
(Anderson, E. J., *et al.*) 2: 120
— Episodic accumulation and the origin of formation boundaries in the Helderberg Group of New York State; discussion and reply
(Wilkinson, Bruce H., *et al.*) 9: 572
— Episodic accumulation and the origin of formation boundaries in the Helderberg Group of New York State; discussion and reply
(Kradyna, James, *et al.*) 10: 637

sedimentary structures *see also* sedimentary rocks; sediments

sedimentary structures—biogenic structures
bioturbation: Abundant and diverse early Paleozoic infauna indicated by the stratigraphic record
(Miller, Molly Fritz, *et al.*) 1: 40
— Abundant and diverse early Paleozoic infauna indicated by the stratigraphic record; discussion and reply
(Pickerill, Ronald K., *et al.*) 9: 567

sedimentary structures—environmental analysis
intertidal environment: Salina-margin tepees, pisoliths, and aragonite cements, Lake MacLeod, Western Australia; their significance in interpreting ancient analogs
(Handford, C. Robertson, *et al.*) 9: 523

sedimentary structures—genesis
neptunian dikes: Neptunic dikes and their relation to hydrodynamic circulation of submarine hydrothermal systems; discussion and reply
(Fuchtbauer, Hans, *et al.*) 4: 251

sedimentary structures—planar bedding structures
varves: Periodic floods from glacial Lake Missoula into the Sanpoil Arm of glacial Lake Columbia, northeastern Washington
(Atwater, Brian F.) 8: 464

sedimentary structures—secondary structures
stylolites: Deformation of Permian strata overlying a zone of salt dissolution and collapse in the Texas Panhandle
(Goldstein, A. G., *et al.*) 5: 314

sedimentary structures—soft sediment deformation
slump structures: Development of foliation and fold interference patterns produced by sedimentary processes
(Tobisch, Othmar T.) 7: 441
— Slumps and their deposits in fan delta front and slope
(Postma, George) 1: 27

sedimentary structures—turbidity current structures
graded bedding: Relative rates of tectonic uplift as determined from episodic turbidite deposition in marine basins
(Klein, George de Vries) 1: 48

sedimentation—controls
paleogeographic controls: Suwannee channel of the Paleogene coastal plain; support for the "carbonate suppression" model of basin formation
(McKinney, Michael L.) 6: 343
tectonic controls: Early poststabilization sedimentation and later growth of shields
(Rogers, John J. W., *et al.*) 10: 607
— Evidence for a margin-truncating transcurrent fault (pre-late Eocene) in western Washington
(Johnson, Samuel Y.) 9: 538
— Recent studies indicate that major structures in northeastern Nevada and the Golconda Thrust in north-central Nevada are of Jurassic or Cretaceous age
(Ketner, Keith B.) 8: 483
— Role of synsedimentary strike-slip faults in the formation of Moroccan Triassic basins
(Laville, Edgard, *et al.*) 7: 424
— Sedimentary basins formed and carried piggyback on active thrust sheets
(Ori, G. G., *et al.*) 8: 475
— Subsidence analysis of the Cordilleran miogeocline; implications for timing of late Proterozoic rifting and amount of extension; discussion and reply
(Link, Paul Karl, *et al.*) 11: 699
— Tectonic control of Triassic sedimentation in southern New Brunswick; local and regional implications
(Nadon, G. C., *et al.*) 10: 619

sedimentation—cyclic processes
glaciolacustrine sedimentation: Periodic floods from glacial Lake Missoula into the Sanpoil Arm of glacial Lake Columbia, northeastern Washington
(Atwater, Brian F.) 8: 464
marine sedimentation: Episodic accumulation and the origin of formation boundaries in the Helderberg Group of New York State
(Anderson, E. J., *et al.*) 2: 120
— Episodic accumulation and the origin of formation boundaries in the Helderberg Group of New York State; discussion and reply
(Wilkinson, Bruce H., *et al.*) 9: 572
— Episodic accumulation and the origin of formation boundaries in the Helderberg Group of New York State; discussion and reply
(Kradyna, James, *et al.*) 10: 637
— Ocean stagnation and ventilation defined by $\delta^{34}S$ secular trends in pyrite and barite, Selwyn Basin, Yukon
(Goodfellow, Wayne D., *et al.*) 10: 583
— Relative rates of tectonic uplift as determined from episodic turbidite deposition in marine basins
(Klein, George de Vries) 1: 48
nearshore sedimentation: Origin of manganese giants; sea-level changes and anoxic-oxic history
(Frakes, L. A., *et al.*) 2: 83
transgression: Correlation of Carboniferous strata using a hierarchy of transgressive-regressive units
(Busch, Richard M., *et al.*) 8: 471

sedimentation—diagenesis
intertidal environment: Salina-margin tepees, pisoliths, and aragonite cements, Lake MacLeod, Western Australia; their significance in interpreting ancient analogs
(Handford, C. Robertson, *et al.*) 9: 523

precipitation: Petrologic and geochemical constraints on the origin of subsurface dolomite, Enewetak Atoll; an example of dolomitization by normal seawater
(Saller, Arthur H.) 4: 217
sebkha environment: Calcification of cyanobacterial mats in Solar Lake, Sinai
(Lyons, W. M. Berry, *et al.*) 10: 623
sedimentation—environment
deep-sea environment: Pseudoconglomerate and a re-examination of some paleoenvironmental controversies
(Stanistreet, I. G., *et al.*) 12: 717
fresh-water environment: C/S method for distinguishing freshwater from marine sedimentary rocks
(Berner, Robert A., *et al.*) 6: 365
sedimentation—processes
biochemical sedimentation: Ultrafine-grained magnetite in deep-sea sediments; possible bacterial magnetofossils
(Kirschvink, Joseph L., *et al.*) 9: 559
deep-sea sedimentation: Deep-sea erosional unconformity in the southeastern Gulf of Mexico; discussion and reply
(Patmore, S. J., *et al.*) 4: 248
— Early Cretaceous platform re-entrant and escarpment erosion in the Bahamas
(Schlager, Wolfgang, *et al.*) 3: 147
deltaic sedimentation: Slumps and their deposits in fan delta front and slope
(Postma, George) 1: 27
glacial sedimentation: Probability of moraine survival in a succession of glacial advances
(Gibbons, Anthony B., *et al.*) 6: 327
glaciolacustrine sedimentation: Sedimentation in a large lake; a reinterpretation of the late Pleistocene stratigraphy at Scarborough Bluffs, Ontario, Canada; discussions and reply
(Karrow, P. F., *et al.*) 3: 185
glaciomarine sedimentation: Cenozoic marine sedimentation and ice-volume variation on the East Antarctic Craton
(Webb, P. N., *et al.*) 5: 287
— Glaciomarine sediments of the Isle of Man as a key to late Pleistocene stratigraphic investigations in the Irish Sea basin
(Eyles, Carolyn Hope, *et al.*) 6: 359
marine sedimentation: Mixing of siliciclastic and carbonate sediments in shallow shelf environments
(Mount, Jeffrey F.) 7: 432
reef sedimentation: Were there framework reefs in the Cambrian?
(Rowland, Stephen M.) 3: 181
sedimentation—provenance
conglomerate: Late Permian-Early Triassic paleogeography of northern Japan; did Pacific microplates accrete to Japan?
(Choi, Dong Ryong) 12: 728
marine sediments: Dispersed rhyolitic tephra from New Zealand in deep-sea sediments of the Southern Ocean
(Kyle, Philip R., *et al.*) 8: 487
melange: Was the Alexander Terrane a source of feldspathic sandstones in the Shoo Fly Complex, Sierra Nevada, California?
(Girty, Gary H., *et al.*) 6: 339
metasedimentary rocks: Precambrian gneiss and late Proterozoic sedimentation in north-central British Columbia
(Evenchick, Carol A., *et al.*) 4: 233
sedimentation—sedimentation rates
deep-sea sedimentation: Low productivity and slow deep-water circulation in Mid-Cretaceous oceans
(Bralower, Timothy J., *et al.*) 10: 614
sedimentary basins: Time-thickness bar diagrams; simultaneous display of lithostratigraphic thickness and chronostratigraphic range
(Mayer, Larry, *et al.*) 1: 7
sedimentation—transport
marine transport: Contourite drift molded by deep Mediterranean outflow
(Faugeres, Jean-Claude, *et al.*) 5: 296
stream transport: William River; an outstanding example of channel widening and braiding caused by bed-load addition
(Smith, Norman D., *et al.*) 2: 78
wind transport: John Day Formation of Oregon; a distal record of early Cascade volcanism
(Robinson, Paul T., *et al.*) 4: 229
sediments *see also* sedimentary rocks; sedimentary structures; sedimentation
sediments—carbonate sediments
diagenesis: Salina-margin tepees, pisoliths, and aragonite cements, Lake MacLeod, Western Australia; their significance in interpreting ancient analogs
(Handford, C. Robertson, *et al.*) 9: 523
sediments—clastic sediments
clay: Spheroids at the Cretaceous-Tertiary boundary are altered impact droplets of basaltic composition; discussion and reply
(Bohor, Bruce, *et al.*) 11: 695
diamicton: Sedimentation in a large lake; a reinterpretation of the late Pleistocene stratigraphy at Scarborough Bluffs, Ontario, Canada; discussions and reply
(Karrow, P. F., *et al.*) 3: 185
mud: Transformation of aragonite-dominated lime muds to microcrystalline limestones
(Lasemi, Zakaria, *et al.*) 7: 420
provenance: William River; an outstanding example of channel widening and braiding caused by bed-load addition
(Smith, Norman D., *et al.*) 2: 78
sediments—marine sediments
composition: Mixing of siliciclastic and carbonate sediments in shallow shelf environments
(Mount, Jeffrey F.) 7: 432
environmental analysis: Baffin Bay; present-day analog of the central Arctic during late Pliocene to mid-Pleistocene time; discussion and reply
(Kellogg, Thomas B., *et al.*) 6: 378
geochemistry: C/S method for distinguishing freshwater from marine sedimentary rocks
(Berner, Robert A., *et al.*) 6: 365
lithofacies: Contourite drift molded by deep Mediterranean outflow
(Faugeres, Jean-Claude, *et al.*) 5: 296
magnetic properties: Ultrafine-grained magnetite in deep-sea sediments; possible bacterial magnetofossils
(Kirschvink, Joseph L., *et al.*) 9: 559
provenance. Dispersed rhyolitic tephra from New Zealand in deep-sea sediments of the Southern Ocean
(Kyle, Philip R., *et al.*) 8: 487
turbidite: Relative rates of tectonic uplift as determined from episodic turbidite deposition in marine basins
(Klein, George de Vries) 1: 48
sediments—pore water
diagenesis: Calcification of cyanobacterial mats in Solar Lake, Sinai
(Lyons, W. M. Berry, *et al.*) 10: 623
seismic methods *see under* geophysical methods
seismic surveys *see under* geophysical surveys *under* Atlantic Ocean; California; Utah
seismology—crust
deep-seated structures: COCORP seismic profiles near Coalinga, California; subsurface structure of the western Great Valley
(Fielding, Eric, *et al.*) 5: 268
deep seismic sounding: Reprocessed COCORP Southern Appalachian reflection data; root zone to coastal plain; discussion and reply
(Cook, Frederick A., *et al.*) 4: 249
reflection: Multichannel seismic evidence for anomalously thin crust at Blake Spur fracture zone
(Mutter, J. C., *et al.*) 9: 534
— Seismic reflectivity of mylonite zones in the crust
(Fountain, David M., *et al.*) 4: 195

seismology—earthquakes
focal mechanism: Earthquakes and folding, Coalinga, California
(Hill, Mason L.) 12: 711
focus: Wrangell Benioff zone, southern Alaska
(Stephens, C. D., *et al.*) 6: 373
seismicity: Crustal warping in coastal Maine
(Anderson, Walter A., *et al.*) 11: 677

seismology—seismicity
terranes: Seismicity and suspect terranes in the southeastern United States
(Wheeler, Russell L., *et al.*) 6: 323

shear zones *see under* effects *under* faults

slope stability *see also* geomorphology; *see also under* engineering geology *under* Hawaii

soil mechanics *see also* rock mechanics

soils—composition
mineral composition: Natural weathering mechanisms of almandine garnet
(Velbel, Michael Anthony) 10: 631

soils—surveys
California: Changing mercury anomalies in Long Valley, California; indication for magma movement or seismic activity
(Varekamp, Johan C., *et al.*) 5: 283
— K-Ar dating of the Cima volcanic field, eastern Mojave Desert, California; late Cenozoic volcanic history and landscape evolution
(Dohrenwend, John C., *et al.*) 3: 163
Nevada: Recurrent Holocene strike-slip faulting, Pyramid Lake fault zone, western Nevada
(Anderson, Larry W., *et al.*) 11: 681

South Africa—petrology
metamorphic rocks: Pseudoconglomerate and a re-examination of some paleoenvironmental controversies
(Stanistreet, I. G., *et al.*) 12: 717

South America *see also* Peru; Venezuela

South Carolina—petrology
intrusions: Juxtaposed Mesozoic diabase dike sets from the Carolinas; a preliminary assessment; discussion and reply
(Butler, J. Robert, *et al.*) 8: 504

South Carolina—seismology
earthquakes: Seismicity and suspect terranes in the southeastern United States
(Wheeler, Russell L., *et al.*) 6: 323

Southern Hemisphere *see also* Antarctic Ocean; Antarctica; Atlantic Ocean; Indian Ocean; Pacific Ocean

Southern U.S. *see also* Alabama

Southwestern U.S. *see also* Arizona; New Mexico; Texas

Southwestern U.S.—structural geology
isostasy: Role of tectonic denudation in warping and uplift of low-angle normal faults
(Spencer, Jon E.) 2: 95

Soviet Union *see* USSR

Spain—sedimentary petrology
sedimentation: Slumps and their depos[illegible] in fan delta front and slope
(Postma, George) 1: 27

Spain—structural geology
deformation: Shear band foliation as an indicator of sense of shear; field observations in central Spain
(Weijermars, Ruud, *et al.*) 10: 603
tectonics: Sedimentary basins formed and carried piggyback on active thrust sheets
(Ori, G. G., *et al.*) 8: 475

Spermatophyta—fossilization
Eocene: Yellowstone fossil forests; new evidence for burial in place
(Yuretich, Richard F.) 3: 159
— Yellowstone fossil forests; new evidence for burial in place; discussion and reply
(Fritz, William J., *et al.*) 10: 638

springs *see also* ground water; *see also under* hydrogeology *under* Florida

stratigraphy—classification
Ordovician: The Decade of North American Geology 1983 geologic time scale; discussion and reply
(Ross, Reuben J., Jr., *et al.*) 8: 505

stratigraphy—methods
graphic methods: Time-thickness bar diagrams; simultaneous display of lithostratigraphic thickness and chronostratigraphic range
(Mayer, Larry, *et al.*) 1: 7
— Time-thickness bar diagrams; simultaneous display of lithostratigraphic thickness and chronostratigraphic range; discussion and reply
(Baldwin, Brewster, *et al.*) 7: 446

strontium—geochemistry
shells: Sr, Mg, and Ca chemistry of the skeleton of Nautilus
(Crick, Rex E., *et al.*) 2: 99

strontium—isotopes
Sr-87/Sr-86: Petrologic and geochemical constraints on the origin of subsurface dolomite, Enewetak Atoll; an example of dolomitization by normal seawater
(Saller, Arthur H.) 4: 217
— Physical and chemical constraints on the evolution of the Columbia River Basalt
(Hooper, P. R.) 8: 495
— Rubidium-strontium dating of ore deposits hosted by Rb-rich rocks, using calcite and other common Sr-bearing minerals
(Ruiz, Joaquin, *et al.*) 5: 259

structural analysis *see also* folds; foliation; tectonics

structural analysis—faults
shear zones: Borrego Springs-Santa Rosa mylonite zone; a Late Cretaceous west-directed thrust in Southern California
(Simpson, Carol) 1: 8

structural analysis—foliation
cleavage: Solution cleavage and its relationship to major structures in the Idaho-Utah-Wyoming thrust belt
(Mitra, Gautam, *et al.*) 6: 354
shear: Shear band foliation as an indicator of sense of shear; field observations in central Spain
(Weijermars, Ruud, *et al.*) 10: 603

structural analysis—fractures
joints: Deformation of Permian strata overlying a zone of salt dissolution and collapse in the Texas Panhandle
(Goldstein, A. G., *et al.*) 5: 314

structural analysis—interpretation
melange: Evolution of the Kid Group, Southeast Sinai Peninsula; thrusts, melanges, and implications for accretionary tectonics during the late Proterozoic of the Arabian-Nubian Shield
(Shimron, Aryeh E.) 4: 242
polyphase processes: Development of foliation and fold interference patterns produced by sedimentary processes
(Tobisch, Othmar T.) 7: 441

structural analysis—lineation
domes: Metamorphic core complexes of Cordilleran type in the Cyclades, Aegean Sea, Greece
(Lister, Gordon S., *et al.*) 4: 221

structural analysis—preferred orientation
dikes: Stress orientations during Oligocene volcanism in Trans-Pecos Texas; timing the transition from Laramide compression to Basin and Range tension
(Price, Jonathan G., *et al.*) 4: 238

structural geology—nomenclature
faults: Fault-related rocks; suggestions for terminology
(Wise, Donald U., *et al.*) 7: 391

structural petrology *see* structural analysis

stylolites *see under* secondary structures *under* sedimentary structures

sulfur—geochemistry
magmas: Transport and concentration of molybdenum in granite molybdenite systems; effects of fluorine and sulfur
(Tingle, Tracy N., *et al.*) 3: 156
— Transport and concentration of molybdenum in granite molybdenite systems; effects of fluorine and sulfur; discussion and reply
(Isuk, Edet E., *et al.*) 9: 568

sedimentary rocks: C/S method for distinguishing freshwater from marine sedimentary rocks
(Berner, Robert A., *et al.*) 6: 365

sulfur—isotopes
S-34/S-32: Ocean stagnation and ventilation defined by $\delta^{34}S$ secular trends in pyrite and barite, Selwyn Basin, Yukon
(Goodfellow, Wayne D., *et al.*) 10: 583

sulphur *see* sulfur

symposia—economic geology
lead-zinc deposits: Mississippi valley-type lead-zinc deposits
(Pratt, Walden P.) 3: 184

symposia—petrology
metamorphic rocks: Blueschist and related eclogites
(Brown, E. H., *et al.*) 5: 318

symposia—stratigraphy
Cretaceous: Cretaceous climates
(Barron, Eric J., *et al.*) 6: 377

symposia—tectonophysics
plate tectonics: The West African connection; evolution of the central Atlantic Ocean and its continental margins
(Rodgers, John, *et al.*) 10: 635

tectonics *see also* epeirogeny; faults; folds; orogeny; plate tectonics; structural analysis; *see also under* structural geology *under* Apennines; Appalachians; Arizona; Australia; California; Canada; Egypt; Greece; Italy; Jamaica; Mexico; Minnesota; Morocco; Nevada; New Brunswick; New Mexico; North America; Pyrenees; Saudi Arabia; Spain; Texas; Venezuela; Washington; Wisconsin

tectonics—evolution
shields: Early poststabilization sedimentation and later growth of shields
(Rogers, John J. W., *et al.*) 10: 607

tektites *see also* meteorites

temperature *see under* metamorphism

tephrochronology *see under* geochronology

terrestrial crust *see* crust

terrestrial mantle *see* mantle

Tertiary *see also* Eocene; Neogene; Paleocene; Paleogene; *see also under* stratigraphy *under* Oregon

Tertiary—stratigraphy
boundary: Spheroids at the Cretaceous-Tertiary boundary are altered impact droplets of basaltic composition; discussion and reply
(Bohor, Bruce, *et al.*) 11: 695
paleoclimatology: Temperature and biotic crises in the marine realm
(Stanley, Steven M.) 4: 205

Texas—sedimentary petrology
diagenesis: Problem of secondary porosity; Frio Formation (Oligocene), Texas Gulf Coast
(Lundegard, Paul D., *et al.*) 7: 399
reefs: Salina-margin tepees, pisoliths, and aragonite cements, Lake MacLeod, Western Australia; their significance in interpreting ancient analogs
(Handford, C. Robertson, *et al.*) 9: 523

Texas—stratigraphy
Cambrian: Geological implications of Middle Cambrian boulders from the Haymond Formation (Pennsylvanian) in the Marathon Basin, West Texas
(Palmer, Allison R., *et al.*) 2: 91

Texas—structural geology
deformation: Deformation of Permian strata overlying a zone of salt dissolution and collapse in the Texas Panhandle
(Goldstein, A. G., *et al.*) 5: 314
tectonics: Stress orientations during Oligocene volcanism in Trans-Pecos Texas; timing the transition from Laramide compression to Basin and Range tension
(Price, Jonathan G., *et al.*) 4: 238

theoretical studies *see under* crust; deformation; geophysics; phase equilibria

thrust faults *see under* displacements *under* faults

time scales *see under* geochronology

trace elements *see under* geochemistry *under* California; intrusions; lava; Peru

tracks and trails *see* ichnofossils

Triassic *see also under* geochronology *under* Alps; France; *see also under* stratigraphy *under* Japan; Morocco; New Brunswick

Trilobita—Redlichiida
Proterozoic: Ediacarian fossils from the Carolina slate belt, Stanly County, North Carolina
(Gibson, Gail G., *et al.*) 7: 387

trilobites—biostratigraphy
Cambrian: Geological implications of Middle Cambrian boulders from the Haymond Formation (Pennsylvanian) in the Marathon Basin, West Texas
(Palmer, Allison R., *et al.*) 2: 91
— Newly discovered youngest Cambrian or oldest Ordovician fossils from the Robertson Bay Terrane (formerly Precambrian), northern Victoria Land, Antarctica
(Wright, Thomas O., *et al.*) 5: 301
Ordovician: The Decade of North American Geology 1983 geologic time scale; discussion and reply
(Ross, Reuben J., Jr., *et al.*) 8: 505

turbidity current structures *see under* sedimentary structures

underground water *see* ground water

United Kingdom *see also* Great Britain; Scotland

United Kingdom—stratigraphy
Pleistocene: Glaciomarine sediments of the Isle of Man as a key to late Pleistocene stratigraphic investigations in the Irish Sea basin
(Eyles, Carolyn Hope, *et al.*) 6: 359

United States *see also* Alabama; Alaska; Arizona; California; Eastern U.S.; Florida; Georgia; Hawaii; Idaho; Maine; Minnesota; Montana; Nevada; New England; New Jersey; New Mexico; New York; North Carolina; Oregon; Pacific Coast; South Carolina; Southwestern U.S.; Texas; Utah; Virginia; Washington; Western U.S.; Wisconsin; Wyoming

United States—geochronology
Ordovician: The Decade of North American Geology 1983 geologic time scale; discussion and reply
(Ross, Reuben J., Jr., *et al.*) 8: 505

uranium ores *see also under* economic geology *under* Canadian Shield; Saskatchewan

USSR—petrology
inclusions: Siberian geotherm based on lherzolite xenoliths from the Udachnaya Kimberlite, USSR
(Boyd, F. R.) 9: 528

Utah—geophysical surveys
seismic surveys: Relationship of late Quaternary fault scarps to subjacent faults, eastern Great Basin, Utah
(Crone, Anthony J., *et al.*) 5: 292

Utah—structural geology
neotectonics: Direction of absolute movement along the boundary faults of the Basin and Range-Colorado Plateau margin
(Hamblin, W. K.) 2: 116

varves *see under* planar bedding structures *under* sedimentary structures; *see under* geochronology

Venezuela—structural geology
tectonics: Early poststabilization sedimentation and later growth of shields
(Rogers, John J. W., *et al.*) 10: 607

Vertebrata *see also* ichnofossils; problematic fossils

Virginia—seismology
earthquakes: Seismicity and suspect terranes in the southeastern United States
(Wheeler, Russell L., *et al.*) 6: 323

volcanic features *see under* geomorphology

volcanic rocks *see under* igneous rocks

volcanism *see under* volcanology

volcanoes *see under* volcanology

volcanology—volcanism
changes: Stress orientations during Oligocene volcanism in Trans-Pecos Texas; timing the transition from Laramide compression to Basin and Range tension
(Price, Jonathan G., *et al.*) 4: 238
evolution: John Day Formation of Oregon; a distal record of early Cascade volcanism
(Robinson, Paul T., *et al.*) 4: 229
— K-Ar dating of the Cima volcanic field, eastern Mojave Desert, California; late Cenozoic volcanic history and landscape evolution
(Dohrenwend, John C., *et al.*) 3: 163
explosive eruptions: Volcanic and stratospheric dustlike particles produced by experimental water-melt interactions
(Wohletz, Kenneth H., *et al.*) 10: 591
mass balance: Continental intra-arc depressions; a nonextensional model for their origin, with a Proterozoic example from Wopmay Orogen
(Hildebrand, Robert S., *et al.*) 2: 73
migration: Frequent shifts of the volcanic zone in Iceland
(Helgason, Johann) 4: 212
periodicity: Hawaiian hotspot volcanism mainly during geomagnetic normal intervals
(Moberly, Ralph, *et al.*) 8: 459
rates: Comparison of volcanic production rates and subduction rates in the Lesser Antilles and Central America
(Wadge, G.) 9: 555
volcanology—volcanoes
La Grande Soufriere: Flank failure-directed blast eruption at Soufriere, Guadeloupe, French West Indies; a 3,000-yr-old Mt. St. Helens?
(Boudon, Georges, *et al.*) 6: 350
Mount Saint Helens: A magmatic geohygrometer; application to Mount St. Helens and other dacitic magmas
(Merzbacher, Celia, *et al.*) 10: 587
— Mount St. Helens 1980 and Mount Pelee 1902; flow or surge?; discussions and reply
(Hoblitt, Richard P., *et al.*) 11: 692
Mount Shasta: Catastrophic debris avalanche from ancestral Mount Shasta Volcano, California
(Crandell, D. R., *et al.*) 3: 143

New Zealand: Dispersed rhyolitic tephra from New Zealand in deep-sea sediments of the Southern Ocean
(Kyle, Philip R., *et al.*) 8: 487
Tambora: Volcanological study of the great Tambora eruption of 1815
(Self, S., *et al.*) 11: 659
Torfajokull: Torfajokull; a volcano dominated by magma mixing
(McGarvie, David W) 11: 685
Washington—geomorphology
glacial geology: Periodic floods from glacial Lake Missoula into the Sanpoil Arm of glacial Lake Columbia, northeastern Washington
(Atwater, Brian F.) 8: 464
Washington—structural geology
tectonics: Evidence for a margin-truncating transcurrent fault (pre-late Eocene) in western Washington
(Johnson, Samuel Y.) 9: 538
Washington—tectonophysics
plate tectonics: Has the Washington-Oregon Coast Range moved northward?
(Beck, Myrl E., Jr.) 12: 737
Washington—volcanology
Mount Saint Helens: A magmatic geohygrometer; application to Mount St. Helens and other dacitic magmas
(Merzbacher, Celia, *et al.*) 10: 587
— Mount St. Helens 1980 and Mount Pelee 1902; flow or surge?; discussions and reply
(Hoblitt, Richard P., *et al.*) 11: 692
water *see also* ground water
weathering *see also under* geochemistry *under* North Carolina; *see also under* geomorphology *under* Morocco
weathering—minerals
almandine: Natural weathering mechanisms of almandine garnet
(Velbel, Michael Anthony) 10: 631
West Indies *see also* Bahamas; Guadeloupe; Jamaica; Lesser Antilles
Western Australia—sedimentary petrology
diagenesis: Salina-margin tepees, pisoliths, and aragonite cements, Lake MacLeod, Western Australia; their significance in interpreting ancient analogs
(Handford, C. Robertson, *et al.*) 9: 523
Western Hemisphere *see also* Atlantic Ocean; Central America; North America; Pacific Ocean
Western U.S. *see also* Alaska; California; Hawaii; Idaho; Montana; Nevada; Oregon; Pacific Coast; Utah; Washington; Wyoming
Western U.S.—petrology
metamorphism: Influence of time on metamorphism of sedimentary organic matter in liquid-dominated geothermal systems, western North America; discussion and reply
(Bostick, N. H., *et al.*) 11: 689
Western U.S.—stratigraphy
Proterozoic: Subsidence analysis of the Cordilleran miogeocline; implications for timing of late Proterozoic rifting and amount of extension; discussion and reply
(Link, Paul Karl, *et al.*) 11: 699
Wisconsin—structural geology
tectonics: Early poststabilization sedimentation and later growth of shields
(Rogers, John J. W., *et al.*) 10: 607
Wyoming—stratigraphy
Eocene: Yellowstone fossil forests; new evidence for burial in place
(Yuretich, Richard F.) 3: 159
— Yellowstone fossil forests; new evidence for burial in place; discussion and reply
(Fritz, William J., *et al.*) 10: 638
Wyoming—structural geology
structural analysis: Solution cleavage and its relationship to major structures in the Idaho-Utah-Wyoming thrust belt
(Mitra, Gautam, *et al.*) 6: 354
xenoliths *see under* inclusions
Yukon Territory—stratigraphy
Paleozoic: Ocean stagnation and ventilation defined by $\delta^{34}S$ secular trends in pyrite and barite, Selwyn Basin, Yukon
(Goodfellow, Wayne D., *et al.*) 10: 583
zoogeography *see* biogeography

Geology Author Index Volume 12

Aines, Roger D. 12: 720
Altaner, Stephen P. 7: 412
Alvarez, Luis 11: 695
Alvarez, Walter 11: 695
Andersen, Bjorn G. 11: 677
Anderson, E. J. 2: 120
Anderson, E. J. 9: 572
Anderson, E. J. 10: 637
Anderson, Larry W. 11: 681
Anderson, R. Scott 11: 677
Anderson, Walter A. 11: 677
Angstadt, D. M. 4: 248
Armin, R. A. 11: 699
Armstrong, Peter B. 10: 623
Aronson, James L. 7: 412
Asaro, Frank 11: 695
Ashwal, Lewis D. 2: 124
Atwater, Brian F. 8: 464
Austin, J. A., Jr. 3: 147
Austin, J. A., Jr. 4: 248
Baldwin, Brewster 7: 446
Banga, Greetje 4: 221
Barazangi, Muawia 5: 268
Barker, Charles E. 11: 689
Barnes, Robert G. 12: 713
Barron, Eric J. 6: 377
Barron, Eric J. 10: 595
Basu, Asish R. 6: 380
Beck, Myrl E., Jr. 12: 737
Bergstrom, Stig M. 8: 505
Berner, Robert A. 6: 365
Bird, D. K. 1: 12
Blom, Ronald G. 6: 346
Boettcher, Art 4: 202
Bohlen, Steve 4: 202
Bohor, Bruce 11: 695
Bollinger, G. A. 6: 323
Bolton, B. R. 2: 83
Bonhommet, Norbert 10: 579

AUTHOR INDEX TO VOLUME 12

Borns, Harold W., Jr. 11: 677
Bostick, N. H. 11: 689
Boudon, Georges 6: 350
Bowring, Samuel A. 2: 68
Bowring, Samuel A. 2: 73
Bowring, Samuel A. 11: 673
Boyd, F. R. 9: 528
Bralower, Timothy J. 10: 614
Brem, Gerald F. 4: 229
Brice, J. C. 4: 209
Briden, J. C. 7: 428
Bridges, Anne E. 11: 677
Brown, Bruce A. 10: 607
Brown, E. H. 5: 318
Brown, Larry D. 5: 268
Brumbaugh, David S. 8: 491
Bruns, Terry R. 9: 563
Budai, Joyce M. 9: 572
Buffler, Richard T. 4: 248
Bukry, David 4: 199
Bullen, Susan B. 11: 655
Burke, Kevin 12: 732
Busch, Richard M. 8: 471
Buseck, Peter R. 5: 283
Butler, Crispin O. 7: 446
Butler, J. Robert 8: 504
Butler, Robert F. 10: 627
Byers, Charles W. 9: 567
Byers, Charles W. 1: 40
Caby, Renaud 2: 108
Calderone, Gary 10: 627
Campbell, J. Frisbee 8: 459
Carman, John H. 9: 568
Carpena, Joelle 2: 108
Carr, Paul F. 5: 274
Cecile, M. P. 7: 403
Chang, Shih-Bin R. 9: 559
Channell, J. E. T. 1: 44
Channell, J. E. T. 11: 701
Chappell, Bruce W. 3: 131
Charlton, Douglas W. 9: 542
Chinn, S. S. W. 4: 209
Choi, Doug Ryong 12: 728
Christiansen, R. L. 3: 143
Cisowski, Stanley M. 6: 369
Cloos, Mark 9: 519
Collins, E. W. 5: 314
Coney, Peter J. 9: 550
Cook, Frederick A. 4: 249
Corso, W. 3: 147
Crandell, D. R. 3: 143
Crick, Rex E. 2: 99
Crippen, Robert E. 6: 346
Criss, R. E. 6: 331
Crone, Anthony J. 5: 292
Crone, Anthony J. 11: 664
Crossen, Kristine J. 11: 677
Crowley, P. 2: 87
Dabbagh, Mohamed E. 10: 607
Davis, Jonathan O. 11: 643
Day, H. W. 7: 416
DeMis, William D. 2: 91
Denton, George H. 5: 263
Derby, James R. 8: 505
Detrick, R. S. 9: 534
Detrick, Robert S. 1: 31
Dickinson, William R. 1: 7
Dickinson, William R. 7: 446
Dickinson, William R. 10: 610
Dohrenwend, John C. 3: 163
Drake, Ellen T. 7: 408
Dreimanis, Aleksis 3: 185
Duffett, T. E. 3: 173
Dunham, John B. 9: 523
Dunn, D. E. 7: 391
Eby, G. Nelson 8: 468
Eggler, David H. 10: 587
Ekren, E. B. 6: 331
El-Sabh, M. I. 9: 569
Elachi, Charles 6: 346
Elders, W. A. 1: 12
Emslie, Ronald F. 6: 380
Engelder, J. T. 7: 391
Ernst, W. G. 7: 436
Etheridge, Michael A. 1: 56
Evans, B. W. 5: 318
Evenchick, Carol A. 4: 233
Eyles, Carolyn H. 3: 185
Eyles, Carolyn Hope 6: 359
Eyles, Nicholas 3: 185
Eyles, Nicholas 6: 359
Faugeres, Jean-Claude 5: 296
Fedonkin, M. A. 7: 387
Feenstra, Anne 4: 221
Fenn, Philip M. 3: 156
Fielding, Eric 5: 268
Flower, Martin F. J. 11: 651
Fluegel, E. 3: 147
Fogleman, K. A. 6: 373
Forbes, R. B. 5: 318
Fountain, David M. 3: 151
Fountain, David M. 4: 195
Fountain, John C. 1: 24
Frakes, L. A. 2: 83
Friend, P. F. 8: 475
Fritz, William J. 10: 638
Fryer, B. J. 8: 479
Fuchtbauer, Hans 4: 251
Gabrielse, Hubert 4: 233
Galloway, William E. 7: 399
Gaudette, Henri E. 10: 607
Gaudette, Henri E. 10: 623
Geiser, P. A. 7: 391
Gentry, Dianna J. 6: 354
Gibbons, Anthony B. 6: 327
Gibson, Gail G. 7: 387
Girard, D. 11: 697
Girty, Gary H. 6: 339
Girty, Gary H. 11: 673
Given, R. Kevin 9: 572
Glicken, H. X. 3: 143
Goldstein, A. G. 5: 314
Goodfellow, Wayne D. 10: 583
Goodwin, Peter W. 2: 120
Goodwin, Peter W. 9: 572
Goodwin, Peter W. 10: 637
Gottfried, David 3: 168
Grant, N. K. 10: 599
Grant, Norman K. 1: 35
Gravenor, C. P. 3: 185
Greenberg, Jeffrey K. 10: 607
Guo, Qiti 4: 202
Hamblin, W. K. 2: 116
Hammarstrom, Jane 9: 515
Handford, C. Robertson 9: 523
Hanson, Brooks 4: 202
Hanson, Richard E. 11: 673
Harding, Samuel T. 5: 292
Hardyman, R. F. 6: 331
Harms, Tekla A. 9: 550
Harwood, D. M. 5: 287
Hatcher, R. D. 7: 391
Hatcher, Robert D., Jr. 8: 504
Hawkins, Fred F. 11: 681
Hay, Richard L. 11: 695
Hay, William W. 6: 377
Hedge, Carl E. 3: 168
Hedge, Carl E. 5: 310
Helgason, Johann 4: 212
Henry, Christopher D. 4: 238
Herman, Yvonne 6: 378
Herriman, Neil 12: 713
Hickman, M. H. 10: 599
Hickmott, D. 2: 87
Hildebrand, Robert S. 2: 73
Hill, Mason L. 12: 711
Hines, Mark E. 10: 623
Hoblitt, Richard P. 11: 692
Hodges, K. V. 2: 87
Hodges, K. V. 3: 151
Hoffman, Paul F. 2: 68
Holloway, John R. 8: 455
Holst, Timothy B. 3: 135
Hooper, P. R. 8: 495
Horton, J. Wright, Jr. 1: 51
Hower, John 7: 412
Hsu, Kenneth J. 4: 251
Huchon, P. 11: 668
Hughes, M. J. 12: 717
Hurich, Charles A. 4: 195
Isuk, Edet E. 9: 568
Iverson, William Paul 4: 249
Jezek, Peter A. 1: 35
Johnson, J. G. 1: 20
Johnson, J. G. 7: 445
Johnson, J. G. 12: 741
Johnson, Noye M. 5: 319
Johnson, Samuel Y. 9: 538
Jonasson, Ian R. 10: 583
Jones, B. L. 4: 209
Jones, Brian G. 5: 274
Jones, D. S. 4: 226
Jones, Lois M. 5: 259
Jones, Norris W. 2: 103
Karlstrom, Karl E. 1: 60
Karrow, P. F. 3: 185
Kauffman, Erle G. 6: 377
Kaufman, Sidney 5: 268
Keigwin, Lloyd 1: 16
Keller, Gerta 1: 16
Keller, Gerta 9: 563
Kelley, Joseph T. 11: 677
Kellogg, Davida E. 5: 263
Kellogg, Thomas B. 5: 263
Kellogg, Thomas B. 6: 378
Kelly, William C. 5: 259
Kendall, Alan C. 9: 523
Kerr, Anne 5: 306
Ketner, Keith 7: 445
Ketner, Keith B. 8: 483
Kirschvink, Joseph L. 9: 559
Kish, S. A. 7: 391
Klasner, J. S. 1: 57
Klein, George de Vries 1: 48
Komar, Paul D. 7: 408
Komar, Paul D. 9: 569
Kradyna, James 10: 637
Kyle, Philip R. 8: 487
Ladd, Jonathan W. 11: 677
Lahr, J. C. 6: 373
Land, Lynton S. 7: 399
Landis, Gary P. 1: 35
Larson, Roger L. 1: 31
Lasemi, Zakaria 7: 420
Laville, Edgard 7: 424
Le Pichon, X. 11: 668
Lee, Fitzhugh T. 11: 677
Lindquist, R. C. 4: 226
Lindsay, Everett H. 5: 319
Link, Paul Karl 11: 699
Lister, Gordon S. 4: 221
Logan, Brian W. 9: 523
Long, David T. 10: 623
Long, Leon E. 2: 103
Lowman, Paul D., Jr. 5: 319
Lowrie, W. 1: 44
Lowrie, W. 11: 701
Lundegard, Paul D. 7: 399
Lyons, W. M. Berry 10: 623
Machette, Michael N. 11: 664
Malpas, John 8: 500
Mann, Keith O. 2: 99
Mann, Paul 12: 732
Maury, R. 11: 697
Mayer, Larry 1: 7
Mayer, Larry 11: 699
Mayer, Larry A. 7: 446
McCoy, Scott, Jr. 9: 563
McDowell, S. D. 1: 12
McFadden, Leslie D. 3: 163
McGarvie, David W 11: 685
McKee, Edwin H. 1: 35
McKee, Edwin H. 4: 229
McKee, James W. 2: 103
McKelvey, B. C. 5: 287
McKinney, Michael L. 6: 343
McNulty, Charles L. 3: 147

AUTHOR INDEX TO VOLUME 12

McQueen, R. G. 10: 591
McSween, Harry Y., Jr. 1: 3
Medioli, F. S. 3: 173
Megeath, Joe D. 6: 327
Mehrtens, Charlotte J. 10: 637
Menard, H. W. 3: 177
Mercer, J. H. 5: 287
Merzbacher, Celia 10: 587
Michel, Helen V. 11: 695
Middleton, G. V. 10: 619
Miller, C. D. 3: 143
Miller, C. Dan 11: 692
Miller, H. G. 1: 60
Miller, Kenneth G. 2: 112
Miller, Molly F. 9: 567
Miller, Molly Fritz 1: 40
Misch, Peter 5: 318
Mitra, Gautam 6: 354
Moberly, Ralph 8: 459
Montanari, Alessandro 11: 695
Moody, Judith B. 3: 191
Moore, James G. 9: 542
Moore, Thomas E. 11: 697
Moores, E. M. 7: 416
Moores, E. M. 8: 500
Morgan, Lisa A. 11: 692
Morgan, Paul 2: 124
Morris, William A. 3: 139
Mount, Jeffrey F. 7: 432
Muehlberger, William R. 2: 91
Muller, Carla 2: 112
Murphy, M. A. 1: 20
Murphy, M. A. 7: 445
Murty, T. S. 9: 569
Mutter, J. C. 9: 534
Nadon, G. C. 10: 619
Neathery, Thornton L. 1: 51
Negrini, Robert M. 11: 643
Newhall, C. G. 3: 143
Newton, M. S. 11: 659
Noble, Donald C. 1: 35
Norrish, Keith 3: 131
Occhietti, Serge 3: 139
Odom, A. Leroy 7: 391
Officer, Charles B. 5: 319
Ogg, James G. 11: 701
Oliver, Jack 5: 268
Olszewski, William J., Jr. 10: 607
Opdyke, Neil D. 4: 226
Opdyke, Neil D. 5: 319
Ori, G. G. 8: 475
Page, R. A. 6: 373
Palmer, Allison R. 2: 91
Palmer, Allison R. 4: 253
Palmer, Allison R. 8: 505
Parrish, Randall R. 4: 233
Parrish, Randall R. 6: 380
Patmore, S. J. 4: 248
Perroud, Herve 10: 579
Peterson, Paula S. 1: 35
Petit, Jean-Pierre 7: 424
Pettingill, Henry S. 6: 380
Pickerill, Ronald K. 9: 567
Pierce, Kenneth L. 6: 327
Plafker, George 9: 563
Plimer, Ian R. 12: 713
Postma, George 1: 27
Powell, Christopher M. 9: 546
Power, J. D. 1: 20
Power, J. D. 7: 445
Pratt, Walden P. 3: 184
Prentice, Michael L. 5: 263
Prezbindowski, Dennis R. 9: 523
Price, Jonathan G. 4: 238
Quinn, Barry G. 5: 274
Ragland, Paul C. 8: 504
Raiswell, Robert 6: 365
Rampino, M. R. 11: 659
Rangin, C. 11: 697
Renz, O. 3: 147
Repetski, John E. 5: 301
Richter, Detlev K. 4: 251
Robb, James M. 5: 278
Robinson, Paul T. 4: 229
Robinson, Paul T. 8: 500
Robinson, Richard A. 2: 91
Rodgers, John 10: 635
Rogers, John J. W. 10: 607
Rollins, Harold B. 8: 471
Rondeel, Harm E. 10: 603
Ross, Reuben J., Jr. 5: 301
Ross, Reuben J., Jr. 8: 505
Rossman, George R. 12: 720
Rowland, Stephen M. 3: 181
Ruiz, Joaquin 5: 259
Saller, Arthur H. 4: 217
Sandberg, Philip A. 7: 420
Sanger, David 11: 677
Sawka, Wayne N. 3: 131
Sawkins, Frederick J. 8: 451
Schamel, S. 7: 391
Schiffman, P. 1: 12
Schlager, Wolfgang 3: 147
Schulz, K. J. 1: 57
Schweickert, Richard A. 11: 673
Scott, D. B. 3: 173
Self, S. 11: 659
Selverstone, J. 2: 87
Semet, Michel P. 6: 350
Seward, Diane 8: 487
Sharpe, David R. 3: 185
Shimron, Aryeh E. 4: 242
Sibley, Duncan F. 11: 655
Simpson, Carol 1: 8
Slack, John F. 12: 713
Smit, Jan 11: 695
Smith, Bernard J. 5: 306
Smith, D. L. 4: 226
Smith, David C. 11: 677
Smith, Derald G. 2: 78
Smith, Norman D. 2: 78
Smithson, Scott B. 4: 195
Smithson, Scott B. 4: 249
Smoot, N. Christian 12: 724
Snyder, Scott W. 2: 112
Sobieski, Theodore H. 2: 120
Sobieski, Theodore H. 9: 572
Sobieski, Theodore H. 10: 637
Sougy, Jean 10: 635
Spangler, D. P. 4: 226
Spear, Frank S. 2: 87
Spencer, Jon E. 2: 95
Spera, Frank J. 12: 707
Stacey, John S. 5: 310
Stanistreet, I. G. 12: 717
Stanley, Steven M. 4: 205
Stanley, Steven M. 12: 741
Steinmetz, J. C. 3: 147
Stephens, C. D. 6: 373
Stern, Robert J. 3: 168
Stott, L. D. 5: 287
Stow, Dorrik A. V. 5: 296
Stransky, Terry 2: 125
Sundvik, Michael 1: 31
Taylor, Brian 12: 724
Taylor, R. P. 8: 479
Teeter, Steven A. 7: 387
Tharp, Thomas M. 1: 56
Thierstein, Hans R. 10: 614
Thomas, M. D. 1: 57
Thompson, Woodrow B. 11: 677
Tingle, Tracy N. 3: 156
Tobisch, Othmar T. 7: 441
Turnell, H. B. 7: 428
Turrin, Brent D. 3: 163
Tyler, David A. 11: 677
Valentine, James W. 11: 647
Van der Voo, Rob 10: 579
Varekamp, Johan C. 5: 283
Veibel, Michael Anthony 10: 631
Verosub, Kenneth L. 11: 643
Vincent, Jean-Serge 3: 139
Vincent, Pierre M. 6: 350
Vogel, Thomas A. 1: 35
Wachter, Joachim 4: 251
Waddell, Carol 1: 24
Wadge, G. 9: 555
Wadsworth, William B. 2: 125
Waitt, Richard B., Jr. 11: 692
Walker, George P. L. 11: 692
Ward, Peter D. 2: 99
Wardlaw, Melissa S. 6: 339
Wardlaw, Melissa S. 11: 673
Warren, Paul H. 6: 335
Watts, D. R. 7: 428
Webb, P. N. 5: 287
Weijermars, Ruud 10: 603
Wells, Stephen G. 3: 163
Whalley, W. Brian 5: 306
Wheeler, Russell L. 6: 323
Whitney, Gene 7: 412
Whitney, Marion I. 9: 569
Whittington, David 8: 504
Wilkinson, Bruce H. 9: 572
Williams, A. E. 1: 12
Williams, Garnett P. 2: 125
Wilshire, H. G. 7: 395
Wilson, Edward Norman 4: 253
Wise, Donald U. 7: 391
Wohletz, Kenneth H. 10: 591
Wolfe, Jack A. 9: 563
Wolff, J. A. 11: 659
Wood, Scott A. 12: 707
Woodward, Geoffrey D. 5: 319
Woodward, Lee A. 9: 531
Wright, Anthony J. 5: 274
Wright, Thomas O. 5: 301
Xenophonotos, Costas 8: 500
Yonkee, W. Adolph 6: 354
Yuretich, R. F. 10: 638
Yuretich, Richard F. 3: 159
Zeitler, Peter K. 5: 319
Zen, E-an 9: 515
Zietz, Isidore 1: 51